



UNIVERSITY OF CAPE TOWN

FACULTY OF COMMERCE

Igniting Knowledge and Opportunity

**ANALYSIS OF DESIGNED AND EMERGENT CONSEQUENCES
OF MOBILE BANKING USAGE BY MSMEs IN KENYA USING
ETHNOGRAPHIC DECISION TREE MODELING**

By

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Professor Irwin Brown

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Declaration

I hereby declare that

**Analysis of the Designed and Emergent Consequences of Mobile Banking Usage by
MSMEs in Kenya Using Ethnographic Decision Tree Modeling**

is my own work and that all sources have been acknowledged through referencing.

Signed by candidate

Mwangi, James Boniface

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DEDICATION

This PhD thesis is dedicated to my wife Lilian and our children Tivona and Caleb and to all those who contributed to its success in one way or another.

Thank You

and

May God Bless You

ABSTRACT

Evaluating the impact of Information and Communications Technologies for Development (ICT4D) has been a challenge both in terms of theoretical and methodological approaches. It has been pointed out in extant literature that ICT4D impact studies are few compared to those that investigate determinants of adoption. Knowledge of this scarcity and the theoretical and methodological limitations led to the conception of this study. This study set out to investigate the decision criteria evaluated by Kenyan micro, small and medium enterprises (MSMEs) when making the initial mobile banking adoption and usage decisions with a view to unearth the designed and emergent consequences. Ethnographic decision tree modeling (EDTM) which is a cognitive research methodology was feasibly employed to obtain the adoption and usage decision criteria from which quantifiable and non-quantifiable consequences were then inferred. Structuration theory was used as a theoretical lens to view the complex context in which mobile banking is embedded and adopted by MSMEs.

The analysis of the empirical data obtained from the MSMEs led to the construction and testing of three decision models from which the study's theory was developed. The derived theory demonstrates the existence of structurational interactions among decision criteria, antecedents of technology adoption, behavioural intention to adopt, and the designed and emergent consequences of actual usage. The study further reveals that contrary to popular belief and argument that adoption of mobile banking technology lowers financial services cost, Kenyan MSMEs adopt the technology not because of its affordability but because of other factors such as perceived usefulness, accessibility, safe custody of daily income, limited organizational capabilities, perceived ease of use, social capital and trust structures. The derived explanatory-predictive theory provides findings that may have significant implications for fiscal and monetary policymakers, development experts and mobile banking technology designers.

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LIST OF ABBREVIATIONS

ATM	Automated Teller Machine
CBK	Central Bank of Kenya
CCK	Communication Commission of Kenya
CID	Criminal Investigation Department
CMA	Capital Market Authority
CSCW	Computer Supported Cooperative Work
CSP	Cultural Systems Paradigm
DOI	Diffusion of Innovation
EDTM	Ethnographic Decision Tree Modeling
Gov	Government
GNP	Gross National Product
GSM	Global System for Mobile Communications
GPRS	Global Packet Radio Service
ICT	Information and Communications Technology
ICT4D	Information and Communications Technology for Development
ITU	International Telecommunications Union
KNBS	Kenya National Bureau of Statistics
MoF	Ministry of Finance
MNOs	Mobile Network Operators
MMTA	Mobile Money Transfer Agent
MSME	Micro, Small and Medium Enterprise
OECD	Organization for Economic Co-operation and Development
SMS	Short Message Service
TOE	Technology, Organization and Environment
TAM	Technology Acceptance Model
UNDP	United Nations Development Programme
USSD	Unstructured Supplementary Service Data
UTAUT	Unified Theory of Acceptance and Use of Technology
WAP	Wireless Application Protocol

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Chapter 1: Introduction and Research Justification**1.1 Introduction**

Chapter one describes the research phenomenon and the motivation underlying the study. The chapter examines the interplay between the designed and emergent consequences of the usage of mobile banking by micro, small and medium enterprises (MSMEs) in the micro level setting and their implications for the designers, vendors and regulators in the meso and macro levels in Kenya, a developing country context (Giddens, 1984). Apart from seeking to unearth the unintended usage consequences and their implications, this thesis aims to contribute to the IS research endeavors by formulating theoretical and methodological bases for ICT4D evaluation (Greene, 1991). A brief outline of the research background and motivation which traces the history and triggers of Kenya's ICT evolution is presented first, followed by a description of the envisaged existing knowledge gaps in mobile banking-in-development-research agenda from the practitioners 'and academics' perspectives. Section three graphically presents the problem statement. The fourth section discusses the research question, objectives, scope and assumptions while section five offers a high-level outline of the thesis's research road map.

1.2 Research Background and Motivation for the Research Problem

Mobile banking technology has gradually but steadily become a permanent fixture in the global banking and financial arena (Duncombe & Boateng, 2009). Notably, both academic and practitioner literature indicate that the poor and vulnerable people in developing countries have been excluded from the mainstream banking and financial services (Donner, 2007; Lyman, Ivatury, & Staschen, 2006). From a development perspective, financial exclusion may potentially delay or retard the socio-economic transformation of the nascent economies of developing countries and the poor people (Birch, 2008).

Existing empirical research reveals a development paradox where some countries in Sub-Saharan Africa have registered remarkable improvement in economic growth with some banks returning supernormal profits, yet the same countries are reported as having huge

sections of their populations left out of formal banking and financial systems (Dermish et al., 2011). Financial alienation in developing country contexts has been attributed in part to such factors as low teledensity, shunning of areas perceived as poor by formal banks, and also to the credit appraisal variables used by commercial banks including intermediation, information asymmetry and consistency of the borrowers' cash flows among other determinants (Koku, 2009; Valverde, Paso, & Fernández, 2007).

Elsewhere the adverse effects of social exclusion have been linked to the advent of informational capitalism in the globalizing world in which individuals as well as societies are denied access to opportunities for autonomous livelihoods in certain contexts (Chigona et al., 2009).

Some solutions have however been proposed by many authors to mitigate the effects of financial exclusion of the poor (Mas & Kumar, 2008). These strategies range from the contentious proposals such as debt cancellation for the poor countries by the Bretton Woods Institutions, to the more accommodated approaches like increasing foreign aid by rich nations to poor countries (Bakvis, 2009; Dessy & Vencatachellum, 2007; Reisen & Ndoeye, 2008). ICTs are also regarded as having great potential to bridge both the knowledge and financial gaps that exist between the rich and the poor, the literate and the illiterate, technology designers and technology consumers, the male and female gender in the human society (Heeks, 2010; Prakash & De', 2007). To contribute to the debate on poverty reduction through financial inclusion, for instance, commercial banks have been implored to use local social structures in lieu of conventional collaterals in order to make the poor gain access to credit (Koku, 2009). But the question that lingers beyond such seemingly novel and brilliant poverty reduction strategies is whether financial marginalization, whatever its cause, is merely restricted to inaccessibility of financial credit by the poor.

Extant literature lends credence to the views of both researchers and practitioners, that the unique financial needs of the marginalized populations, restrictive service costs as well as the nature of the delivery infrastructure may hold the key to the war against financial marginalization (Mas & Kumar, 2008). Trauth & Howcroft (2006, p. 3) postulate that, "*the consequences of ICTs are revealed in the individuals who directly experience social*

exclusion”. ICT4D scholars on the other hand have argued that mobile devices such as cell phones may effectively address the financial service deployment concerns of ‘who’, ‘how’, ‘when’, and ‘where’ aspects of financial service delivery and therefore comparatively possess greater potential to bring on board the financially alienated persons (Mas & Kumar, 2008). This perhaps explicates *ex ante* the reason why mobile technologies are seen as a viable means through which the negative effects of financial exclusion could be mitigated by making banking and financial services both affordable and accessible to the poor people (Brown et al., 2003).

Financial inclusion through cell phone banking is therefore seen as a key development objective and is responsible for the roll out of several pro-poor ICT initiatives including Safaricom’s M-PESA in Kenya, the GCash in Philippines, the Wizzit of South Africa, and the Grameen Bank’s Village Phone Programme in Bangladesh *inter alia* (Ivatury & Pickens, 2006; Jack et al., 2010). Accordingly, massive adoption and use of mobile technologies in developing and transitioning economies is driven by a belief in their potential to alleviate poverty, promote equity and enhance socio-economic inclusion (Mas & Kumar, 2008; Deen-Swararray, Ndiwalana, & Stork, 2013). Nonetheless, the transformational potential of mobile commerce applications such as mobile banking in relation to the emancipation of the poor people has been questioned (Porteous, 2007).

Extant literature provides useful elucidation on the determinants of adoption and use of mobile banking (Brown et al., 2003; Sulaiman, Jaafar & Mohezar, 2007). For instance, pre-innovation assumptions by change agents as highlighted in Rogers (2003) may perhaps underscore the reasons for having only a dearth of published writing on ICT innovations’ impact on micro, small and medium enterprises (MSMEs). The inadequacy of context-specific research knowledge on mobile finance in developing countries has been decried by some ICT4D authors (Donner, 2008; Duncombe & Boateng, 2009). Some researchers have taken issue with investigations of ICTs’ impact on society which are premised on a modernization paradigm that erroneously equates ‘development’ with ‘economic growth’ adding that such approaches only investigate the quantifiable and tangible variables. Such evaluations have failed to effectively unearth or examine the more elusive intangible and non-

quantifiable variables, benefits and or impacts of ICTs from a developmental perspective (Gomez & Pather, 2011). According to Agarwal & Ritu (2005), ICTs have profoundly impacted individuals, organizations, and economies and therefore IS scholarship should be reoriented to focus more on impact of the IT artifact rather than on the design of the artifact itself.

Kenya, as an emerging economy, has the largest mobile financial platform globally and empirical evidence based on numerical figures puts the total value of transactions at more than Kenya shillings 187 billion per month (Kiringai et al., 2010). Beyond the notion of ICTs having the potential to address the social ills that confront the human race on the financial front, calls have been made for empirical research to examine the real outcomes of mobile banking technology when adopted by poor sections of the Kenyan population and by MSMEs as significant contributors to the country's gross domestic product (Mbogo, 2010).

This thesis research contributes to the preceding knowledge gap by investigating the designed and emergent consequences of mobile banking usage by Kenyan MSMEs and their cultural, socio-economic, legislative and technological implications for the stakeholders. In particular, this study intimates that there is a relationship between ICTs' usage consequences and the decision-making processes of MSME operators and that those consequences could be made sense of by examining the common-sense discourse of MSMEs' decision-making processes using ethnographic decision tree modeling (Gladwin, 1989a).

The design of Kenya's mobile banking system is such that MSME operators, their suppliers and customers, mobile network operators (MNOs), mobile-money transfer agents (MMTAs), banks and regulatory agencies constitute a social system that provides human and institutional agency responsible for: buying a cell phone, loading airtime, opening bank accounts, registering for mobile banking, stock ordering, receiving or making payments, receipting, withdrawing from or depositing into mobile-money or bank accounts; enforcing regulatory directives; designing, deploying and customizing mobile banking applications, and setting tariffs. Such intentional actions represent routinized social practices enacted through "regularized relations of relative autonomy and dependence" established and sustained in co-

presence or social integration as well as in extended time-space contexts (Giddens, 1984). Accordingly, a structuration lens has been used to uncover the ‘social integration’ and ‘system integration’ phenomena in mobile banking system interactions. For example, a cash transaction in the context of stock selling, withdrawing or depositing money over the counter of either the bank or MMTA, represents ‘systemness on the level of face-face interaction’ between MSMEs on one hand and customers, suppliers, MMTAs, Banks on the other (cf. Giddens, 1984).

As is later explained in chapter 4, this study uses ethnographic decision tree modeling (EDTM) to improve our collective understanding of how Kenyan MSMEs make mobile banking non-adoption, adoption and usage decisions and how they relate to designed and emergent consequences (Gladwin, 1989a). Both EDTM and structuration theory embrace the voluntarism of human agency (Jones & Karsten, 2008). A decision maker chooses one option among several available alternatives based on the underlying choice criteria (Gladwin, 1977). Giddens (1984) argues that human agents have several possibilities open to them. For instance, the MSME operator agency is voluntaristic in that the operator may choose among many available methods of transacting including bankers cheque, cash, and mobile banking systems inter alia. A predictive-explanatory theory is envisaged as the study’s contribution to knowledge that will presumably underpin formulation of more effective regulatory frameworks, development of more usable and secure mobile banking applications besides providing impetus for future research.

1.2.1 Background of Kenya’s Mobile Banking Platforms

To set the fast pace of mobile banking technologies in Kenya, Telkom Kenya Limited established a mobile-network subsidiary, Safaricom Kenya Limited in 1999 as the first mobile operator. In 2000 Airtel Kenya Limited (formally KenCell Limited and later Zain Kenya Limited), entered the market and grew quickly to launch its mobile payments system dubbed ZAP in 2009. In 2004, Econet Wireless Limited was awarded the third mobile operator license (YuCash) while in the same year, close to 80 Internet Service Providers (ISPs) were licensed in the country effectively ending the monopoly of Telkom Kenya

Limited (Kiringai et al., 2010). Safaricom Kenya Limited grew rapidly and launched its own mobile payments system called M-PESA in March 2007 (Mbogo, 2010).

1.2.2 Knowledge Gap: A Practitioners' Perspective

This section traces the history of Kenya's ICT boom as well as the growth motivators for what is currently touted as the globe's largest mobile banking platform. From a practitioners' perspective, deployment and adoption of mobile banking technologies create both challenges and opportunities for vendors and consumers. The growth of Kenya's ICT sector including mobile banking revolution in the last decade has been attributed to a shift from a strict state regulation of the telecommunications sector to a more flexible and permissive regulatory framework (Kiringai et al., 2010). Policymakers and regulators in the financial and telecommunication sectors are currently finding themselves faced with a choice between prohibitive and permissive regulatory regimes, both of which form a dichotomy.

Kenyan mobile network operators (MNOs) took the lead in the conception, construction and deployment of mobile banking systems under conditions of minimal and highly flexible regulations thus creating serious concerns for the country's banking and financial sector regulators (Ng'ang'a, 2009; Riley, 2003). This is a notable empirical observation in the Kenyan case, since most mobile banking innovations in developed countries are usually initiated by banks under very robust regulatory frameworks (Weber & Darbellay, 2010). This perhaps underpins the sentiments expressed by a governor of the Central Bank of Kenya when he contended that, *"The goal of an optimal regulatory regime should be to have rules tight enough to protect users and discourage fraud, but loose and open enough to encourage innovation and development of new services"*¹.

The US Under-Secretary for democracy and global affairs further posited, *"We face the challenge of balancing consumer protection and financial stability objectives with the desire*

¹ www.newsafrika.net

*for innovation and scale. For example, the introduction of non-bank actors as conduits of financial transactions is a concern for responsible regulators*².

The preceding statements, point to a practitioners' dilemma in choosing between either *permissive* vs. *prohibitive* regulatory frameworks. This study argues that unintended consequences of mobile banking technologies constitute a relevant and persisting ICT4D problem that ought to be investigated so as to create sound knowledge needed to balance ICT innovation with regulatory prudence (Weber & Darbellay, 2010). Kenya's mobile banking platform is unique in that, the Central Bank of Kenya and other government regulatory agencies allowed mobile-banking innovations to precede the process of formulating appropriate regulatory frameworks (Kiringai et al., 2010). Therefore it is necessary to investigate both designed and emergent consequences of mobile banking innovation under deregulation (herein referred to as '*permissive regulation*') versus innovation under strict regulation (herein referred to as '*prohibitive regulation*'). Deregulation in Kenya triggered and facilitated stiff competition among the telecommunications sector players that led to the ICT innovations, the impact of which this study investigates (Kiringai et al., 2010). IS impact evaluations are needed in order to determine if mobile technologies are really what they are perceived to be that is, a 'silver bullet' for the development in Sub-Saharan Africa (Aker & Mbiti, 2010).

The envisaged knowledge outcome of this inquiry is also critical when viewed through the lens of the East African Community Protocol requirement that member states should begin to move toward common markets in telecommunications, mobile finance and banking sectors. A better theoretical conceptualization of mobile banking IT artifact will address some of the ICT4D researchers' and practitioners' concerns such as offering consumer protection without killing innovation (Duncombe & Boateng, 2009).

² www.microfinanceafrica.net.

1.2.3 Knowledge Gaps in ICT4D's Mobile Banking Inquiry: Academics' Perspective

As earlier noted in section 1.1, mobile technologies have become common phenomena in the field of banking and finance globally (Slewe & Hoogenboom, 2004). However, despite the growing number of initiatives using mobile phones to provide financial services to the destitute, there is relatively little scholarly research on the impact of mobile banking technology on the Kenyan MSMEs (Duncombe & Boateng, 2009). While calling attention to this gap in academic literature Donner & Tellez (2008) report on an analysis of 200 research articles on mobile banking that reveals a general lack of context-specific research arguing that contextual studies are germane to effective assessment of adoption, use and impact of mobile banking applications. IS researchers therefore make a strong case for a detailed inquiry into the bi-directionality of influence, amplification versus change, and the theme of multi-dimensionality of trust in order to increase the theoretical clarity on mobile banking IT artifact (Donner & Tellez, 2008; G. Kim, Shin, & Lee, 2009; Molony, 2007). This thesis is a qualitative research endeavor conducted to address some of the highlighted concerns by inquiring into the intended and unintended and emergent outcomes of mobile banking use within the social context of Kenyan MSMEs from a developmental perspective.

Reported empirical observations further reveal that multi-faceted risk perceptions are a salient antecedent to the acceptance of innovative ICTs (Luo et al., 2010). A good exemplar of this notion is Deng et al. (2010) where the consumer's intention to use mobile banking is predicted using Technology Acceptance Model (TAM). The authors' contention that the potential users' attitude toward mobile banking is influenced by trust-based constructs and perceived credibility seems to go counter to the empirical observations made in Kenya. Statistical data provided by World Bank indicate that by December 2010, barely four years after the launch of Kenya's first mobile payment system, over 15 million Kenyans which accounts for more than a third of the country's 39.4 million people, were already actively using mobile banking services (Kiringai et al., 2010).

MSMEs as users of mobile banking systems are the focal point of this research because of the role they play as potential enablers of socio-economic transformation for both Kenya and other developing economies (Adekunle & Tella, 2008; Duncombe, 1999). For instance, there

is a general consensus among the academics and practitioners that MSMEs could potentially foster diversification of markets besides harnessing and promoting ICT innovations (Barth, Lin, & Yost, 2011). MSMEs' capacity to address many social ills by creating employment opportunities is also a highlight of much ICT4D literature (Pajo, Coetzer, & Guenole, 2010; Tambunan, 2007; Tambunan, 2003). MSMEs' developmental role may therefore be said to help actualise Giddens' new millennium view of poverty that *"...for the majority of those who experience it, poverty is not a permanent condition demanding long-term assistance programmes"* Rogers (2003) while citing Giddens (2000).

Further, Walsham & Sahay (2006) make a specific call to broaden the ICT4D research agenda to encompass the specific aims and implications of social and economic transformations. The authors underscore the need for a sharp focus on "point" implementations of ICTs in order to assess their overall relevance and cultural sensitivity. In addition, although the notion of security conveys different connotations to varying categories of end-users, it has been argued that the perception of such concepts as security may be improved if they are investigated in the post-adoption phase as part of impact assessment (Morawczynski & Miscione, 2008).

Moreover, the rising global interest among donors, governments and regulators of the banking sector in the role of mobile technologies in developing countries has led to the creation of a strong nexus of practitioners and donors that has funded the development of several mobile finance initiatives targeted at the MSMEs and the poor people (Duncombe & Boateng, 2009). Existing IS research highlights the potential of mobile banking technologies to transform MSMEs citing many examples in Kenya, Philippines, South Africa and Bangladesh (Jack et al., 2010; Kabukuru, 2010). However, academic research and conceptual understanding of mobile phone financial services lag behind the rapid pace of change on the ground and this necessitates some investigation to bridge the ever-widening gap (Donner, 2008; Duncombe & Boateng, 2009).

An empirical study using the Technology Adoption Model (TAM) and confirmatory factor analysis on a sample of 409 micro-business entrepreneurs in Kenya assessed the impact of

mobile payments on the growth and success of small businesses and concluded that perceived accessibility, low cost, support from the providers, convenience, security and perceived satisfaction are key determinants of success and growth of MSMEs (Mbogo, 2010). A critical analysis of the findings of the highlighted research however, reveals that the researcher's primary focus was more on the factors of adoption of mobile payments rather than on impact assessment. This study acknowledges the consensus among researchers and practitioners regarding the potential of mobile banking for the MSME sector, but argues that existing studies have not investigated the designed and emergent outcomes of this technology in relation to Kenyan MSMEs.

Mobile phone technologies were launched less than a decade ago and in 1999 only one in 1000 Kenyans had a cell phone service. Therefore the massive adoption of mobile banking by over a third of Kenya's population, mostly drawn from the lower levels of the wealth pyramid is significant (Kiringai et al., 2010; Deen-Swararray, Ndiwalana, & Stork, 2013). Survivalist as well as entrepreneurial MSMEs form part of this growing number of enthusiastic users of mobile banking systems, presumably so since the poor people have been locked out of mainstream banking as a result of information asymmetry, intermediation, and inconsistent cash flows based on which banks undertake credit rating (Shaffer, 2004; Valverde et al., 2007). As Table 1.1 shows, many Kenyan MSMEs like their counterparts in the East African region use mobile phones in business operations.

Table 1.1 Informal businesses' use of mobiles, East Africa Region (Research ICT Africa, 2012)

Country		Kenya	Uganda	Tanzania	Rwanda
Use of mobile for business purposes		67.4%	67.9%	44.4%	53.4%
Use of SMS or text messages	Send	78.1%	27.2%	77.3%	63.9%
	Receive	55.3%	18.1%	37.4%	33.3%

It has been argued that many users in developed countries generally adopt mobile banking technologies because of their inherent time and space independence and overall effort-saving attributes (Mallat et al., 2004). However, their rapid uptake in developing country contexts adds the dimensions of affordability, development objectives and socio-economic

transformations (Duncombe & Boateng, 2009). In particular, mobile banking helps people who cannot afford the traditional bank account to send, receive or save money (Dermish et al., 2011; Donner & Tellez, 2008; Lyons & Scherpf, 2004; Mas & Kumar, 2008; Rhine & Greene, 2006). This perhaps underpins Weber's (2010) contention that, "*In sum, customers are keen on adopting the mobile banking services as soon as three key requirements are met: simplicity, cheapness and rapidity*" (p. 130) all of which are underpinned by factors such as convenience, as well as improved speed and security of modern wireless application protocol (WAP) technology and reduction in cost of mobile phones (Waema, Adeya, & Ndung'u, 2010). While taking note that Weber (2010) largely quotes cases drawn from the developed world, this research goes ahead to investigate whether such determinants of adoption are part of the decision criteria that inform the human behavioural choices of mobile banking service adopters in a developing country context using ethnographic decision tree modeling (EDTM) methodology (Gladwin, 1989a).

Although methodological issues are covered in greater detail later in this thesis, it's worth pointing out that this study was deliberately carried out in a naturalistic context with an initial exploratory and convenience sample of 15 MSME informants who cut across users and non-users of mobile money innovations, followed with a further investigation of a purposive, heterogeneous sample of 45 MSME informants who were active users of mobile banking systems (Patton, 2002). The analysis concludes with two actual usage models that are simultaneously tested on two independent samples of 89 MSMEs (cf. Gladwin, 1989a). For triangulation purposes, data collection methods used in the study included ethnographic interviews (Spradley, 1979) and participant observations (Spradley, 1980), field notes, and documents analysis (Wolcott, 1994). Data were analyzed using an inductive, ongoing and evolving process of identifying themes within a particular context (Miles & Huberman, 1994). This approach, it is envisaged, renders this research holistic and restricts its focus on the MSMEs' usage experiences which are either negative or positive (Denzin & Lincoln, 1998). Qualitative research deeply interrogates the subjects' context (Agar, 1996; Creswell, 1998). Qualitative researchers investigate a social or human problem and construct a complex, holistic picture, through analysis of words and then report a detailed account of the

informants about the research phenomenon in their own setting. (Creswell, 1998; Cañas, Novak, & González, 2004).

Conducting this study in Kenya, a country in Sub-Saharan Africa appropriately situates the research in a developing country context, and presumably provides the possibilities of replication in other developing nations.

The foregoing discussion creates a sense of massive adoption of mobile banking technologies by the lower levels of Kenya's wealth pyramid, but leaves the inquirers with a gap in knowledge as to the real impact of mobile banking usage by Kenyan MSMEs. This qualitative research endeavours to expand the narrow empirical evidence upon which the state of current knowledge on mobile banking and mobile payments is said to be anchored (Duncombe & Boateng, 2009).

Although mobile banking technologies have been examined using various theoretical tools, no known study has attempted to employ ethnographic decision tree modelling (EDTM) to investigate their unintended consequences (Gladwin, 1989a). A web search conducted by the researcher using Google Scholar, ScienceDirect, Ebscohost, and Association of Computing Machinery (ACM) internet search engines and other tools did not yield much. This thesis therefore breaks new research grounds by investigating the consequences of mobile banking usage by looking at the usage decision criteria of MSMEs' owners and managers (cf. Bailey & Ngwenyama, 2013)

Moreover, this research is occasioned by a realisation that our modern human society is increasingly dependent upon a multiplicity of ubiquitous ICTs that are both pervasive and invasive and that IS scholars owe a duty both to themselves and to the society in which they live to determine the future ahead as enacted by ICTs (Orlikowski & Iacono, 2001). Conducting IS research is necessary to save ourselves from the disgrace of sitting back as "passive observers of the technological transformations occurring around us" (Orlikowski & Iacono 2001, p. 133), where "we risk fulfilling our own worst prophecies of technological determinism" (Williams & Edge, 1996). Empirical observations clearly indicate that the

evolution of mobile banking is fast-paced and nearly unpredictable as to which other area of the financial service sector it is likely to permeate in the Kenya's social-economic context.

According to Williams, Booth & Coulomb (1995),

“A research problem, unlike a practical problem is motivated not by palpable unhappiness, but by incomplete knowledge or flawed understanding. You solve it not by changing the world but by understanding it better” (p. 59).

And as the authors argue elsewhere,

“Without trustworthy and tested published research available to us, we would be locked in the opinions of the moment, prisoners of what we alone experience or dupes to everything we hear” (p. 10)

1.3 High-level Graphical Definition of the Research Problem

The use of graphics over textual narratives to map out complex scenarios with entities interlinked by complex relationships has been embraced by researchers across multiple academic disciplines and by knowledge workers including software engineers, architects and engineers (Kawabata & Itoh, 2006; Moody, 2009; Ottensooser et al., 2012; Pressman & Ince, 1992). To underscore the relevance of visual notations and rich pictures, Whetten (1989) makes a case on what constitutes a theoretical statement or model, contending that a graphical representation easily clarifies the author's thought process and enables his or her readers to comprehend the complex relationships present in the research context. Therefore, visual models such as nomological nets may help theory developers and users to achieve a balance between parsimony and completeness (Whetten 1989).

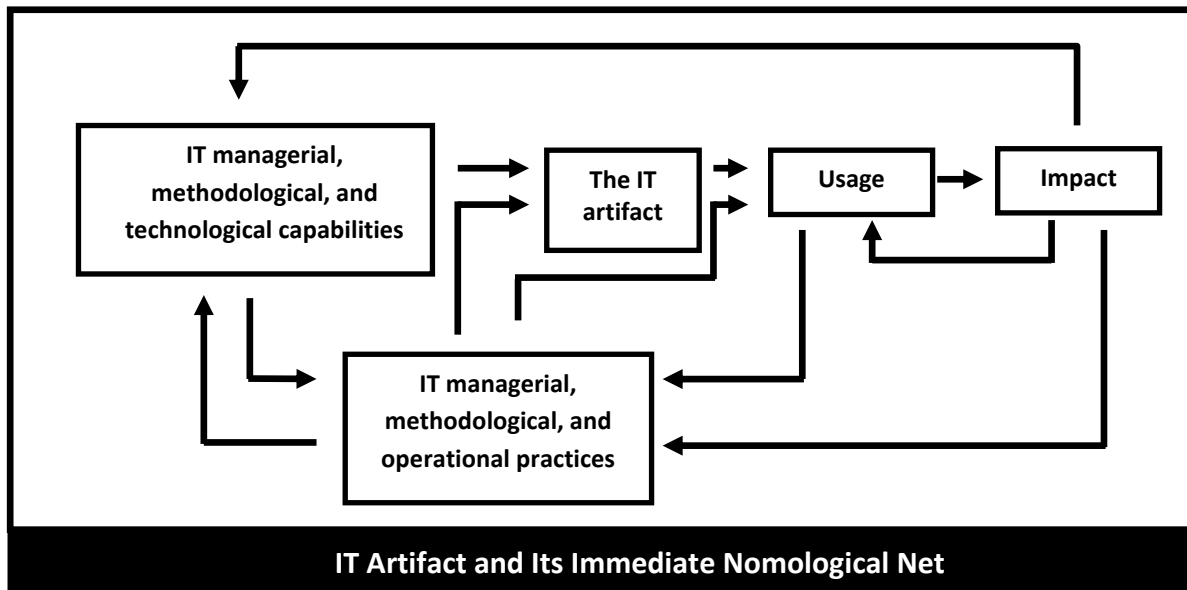
Arguably, representing rudimentary components of a study's theoretical statement graphically aids readability and comprehension of the proposed theory (Dubin, 1978; Lynham, 2002; Whetten, 1989). Benbasat & Zmud (2003) point out the need for IS scholarship to restrict its research focus to the relationships and constructs depicted in the broader IS nomological net shown in figure 1.1 since they constitute the core properties of the IS discipline. The authors'

stance, though considered equivocal by some researchers, is that an inquiry that is devoid of the discipline's core constructs may lead to an outcome that contains '*errors of exclusion*' where what is core to the IS field is left out in favour of the less significant and secondary concepts, or worse still, one that contains '*errors of inclusion*' occasioned by the inquirers focusing on constructs viewed as external to the core properties of IS. And perhaps to support their own stand on 'inclusion' versus 'exclusion' of core IS research phenomena, Benbasat & Zmud (2003) further postulate that,

"...the IS research community is making the discipline's central identity even more ambiguous by all too frequently, under-investigating phenomena intimately associated with IT-based systems and over-investigating phenomena distantly associated with IT-based systems" (p. 184)

This view is derived from the notion that the IS discipline's involvement of too many actors drawn from across multiple backgrounds and with conflicting interests might have led to the field's nebulous character and kept it from asserting its cognitive legitimacy within the scholastic environment (Agarwal & Lucas Jr., 2005; Baskerville & Myers, 2002; Benbasat & Zmud, 2003).

Figure 1.1 Distinctive Core Properties of the IS Field (Benbasat & Zmud, 2003)



The proponents of the general IS nomological net shown in figure 1.1 above contend that the IS field can legitimise its cognition by redirecting its scholarship to the three broad subdomains of knowledge outlined in table 1.2.

Table 1.2 The Broad IS Knowledge Subdomains, in Search of the IS Field's Cognitive Legitimacy (Benbasat & Zmud, 2003)

Subdomain	IS knowledge collectively sought
1.	Conception, construction and deployment of IT artifacts
2.	Usage, support, customization and evolution of IT artifacts
3.	How ICTs impact and are impacted on by their societal contexts

Although the general IS nomological net has the potential to reorient IS research to its salient core constructs and enhance the discipline's identity over and above having the potential to remove obscurity and make conspicuous what Benbasat & Zmud (2003, p. 183) refers to as '*the claimed central character, the claimed distinctiveness, and the claimed temporal continuity*' of the IS field, caution abounds in extant literature not to over-restrict IS scholarship to the six domains of the nomological net but to permit a healthy cross-pollination

with other disciplines (Alter, 2003; Guthrie, 2003; Holland, 2003; Iivari, 2003). A focus on both micro and macro research questions is needed to make the narrative comprehensive if at all the IS profession is to tell a powerful and exciting story (Agarwal & Lucas, 2005, p. 396). Iivari (2003) calls on inquirers to juxtapose theory and practice by taking cognizance that the IS discipline is an artificial discipline that develops IT artifacts that ought to make sense and be useful to its clients, the IS practitioners. While sharing the non-restrictive IS research approach, Alter (2003a) postulates,

“If it is true that the general managers and IS practitioners are the customers of the academic IS field, consciously producing products whose defining features guarantee rejection by those customers seems self-defeating” (p. 624)

This thesis research holds the view that a non-restrictive middle ground is vital in order to generate research outcomes that are relevant to all stakeholders who include the IS research community, IS practitioners, and policy makers (Holland, 2003). This stance seeks to achieve a healthy balance between rigor versus relevance, theory versus practice as well as restriction versus diversity (Keen, 1991). As a multidisciplinary domain the IS field has been challenged to deepen its links with contributing disciplines by adopting a more holistic view of the studied social systems and investigate research questions that are either directly related to or are peripheral to the IT artifact (DeSanctis, 2006; Robey & Markus, 1998; Robey, 2003). A macro IS research focus has potential to examine the transformational impact of ICTs on organizations, environments and strategy, besides moving the IS discipline to a “compelling relevance proposition” and overcoming the perceived identity crisis (Benbasat & Zmud, 2003). Therefore, the IS research should explore other phenomena related to IT artifact in order to make it relevant to business practitioners (Alter, 2003). While advocating a non-exclusive IS research approach, Holland (2003) posits,

“The diversity of the IS research community is its strength and multidisciplinary research should not be sacrificed to achieve theoretical neatness that would hardly be recognized let alone valued, by IS practitioners and undermine the position of IS researchers in universities” (p. 605).

1.3.1 Nomological Net for the Research Problem

Having looked at the role of the graphical notations in theory building in the preceding paragraphs, this subsection briefly describes the components of the nomological net that graphically outlines the thesis's phenomenon of interest and the research context.

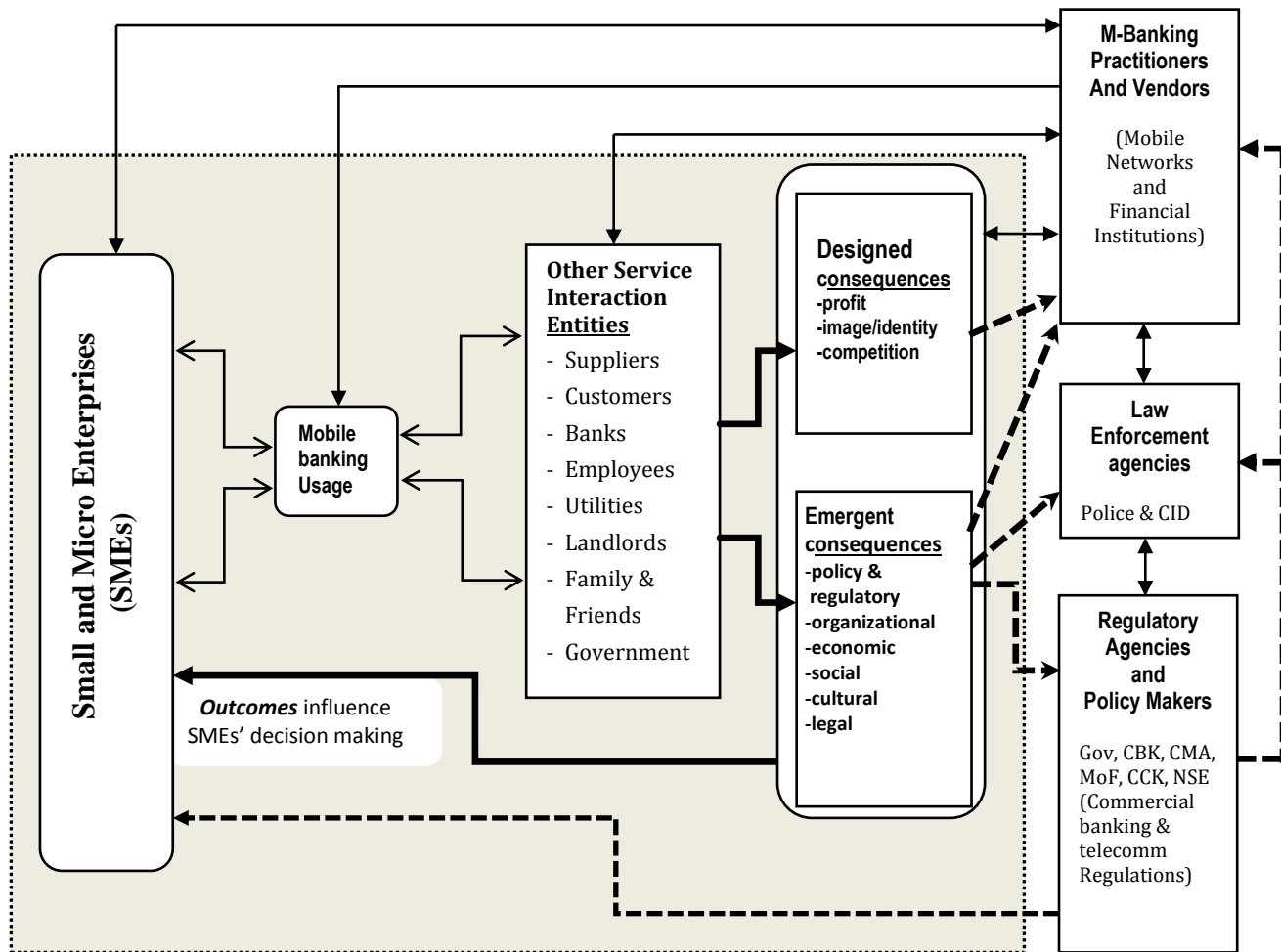


Figure 1.2 Derived Nomological Net for the Research Problem

1.3.2 Narration of Factors, Constructs and Entities of the Study's Nomological Net

This sub-section explicates the rationale behind this study's theoretical model. Thus the derived nomological net in figure 1.2 represents this study's theoretical statement taking into account the need for comprehensiveness and parsimony in the design of theory (Gregor, 2006; Wacker, 1998; Whetten, 1989). The nomological net situates the research problem in the usage and impact domains of the wider IS nomological net as depicted by Figure 1.1 in section 1.3 (Benbasat & Zmud, 2003). The nomological net further eases the conceptualization of the social system under focus while setting and delimiting the scope of the research. By outlining the social context for the research phenomenon, the nomological

net further focuses the thesis discussion on a specific set of knowledgeable social actors and institutional agents who include MSMEs, their suppliers and customers, banks, mobile network operators (MNOs), and regulatory agencies in banking and telecommunications sectors. The entities interact in the modelled social system in such a way that their acts provide the agency that produces and is reproduced by the social structure that is reified by the mobile banking IT artifact (Giddens, 1984; Porpora, 1989). For instance, the voluntaristic acts that constitute MSMEs' registration for mobile banking service and subscription to MNO cell phone service, as well as actual usage of the two services in a future time-space context are forms of agency.

The nomological net represents an argument that the use of mobile banking by MSMEs may result in 'designed and emergent consequences of intentional human action' (Lyytinen & Ngwenyama, 1992). Designed consequences are the carefully planned, premeditated and usually positive outcomes that define the expectations of the IS practitioners, vendors, development agencies and the national governments, usually built by designers into the materiality of the IT artifact (Kaptelinin & Nardi, 1997). Dotted arrow lines imply that there are some invisible, subtle outcomes of ICTs' usage totally unintended and therefore referred to as emergent consequences in this study. Such consequences may be positive or negative but once exposed they may have major implications for the banking and telecommunications regulation. Besides pointing to the notion of causality among the variables of the research context, return arrows also imply social actors' corrective action or a possible move to enhance service by incrementally modifying the IT artifact, making better policies and or (re)designing regulatory frameworks (Weber & Darbellay, 2010).

IS designers are expected to meticulously plan and consciously build the expected functionality that constitutes the 'designed outcomes' into the IT artifact (Kaptelinin & Nardi, 1997). However, designers' planning is contingent upon partial knowledge of the target user groups, their culture and social context and as some improvisation theorists assert, consumers of ICTs too have subtle and varying degrees of creativity (Trotter et al., 2012). The hidden capacity for unforeseen creativity, innovation and adaptation may potentially enable adopters'

of a mobile banking system to use it in ways unintended by designers thus resulting in emergent consequences that are either positive or negative (Trotter et al., 2012).

Rob Kling, a social informatics theorist argues for a holistic interdisciplinary approach to the study of the design, uses, and consequences of ICTs that takes into account their interaction with institutional and cultural contexts (Kling, 2000a). Moreover, the usage context of ICTs directly affects and generates new meanings and roles that can be gleaned through interviews with the insiders of the culture under focus (Myers, 1999). ICTs are not value-neutral since their usage has the potential to create winners and losers. When MSMEs and the unbanked poor access financial services through mobile network operators, commercial banks lose part of their banking business to the new entrants in the financial arena. Mobile financial service offerings help mobile networks to diversify and increase their revenue streams, but their entry into the banking and financial sector poses new challenges for the banking and telecommunications regulatory authorities (Duncombe & Boateng, 2009).

The use of ICTs may lead to multiple often paradoxical effects, that is, emergent or unintended consequences with serious implications for the stakeholders. ICT usage generates moral and ethical aspects that have social consequences and as Kling (2000a) postulates, ICTs co-evolve during design, development and use phases. Therefore this study also investigates and uncovers the moral and ethical consequences of mobile banking usage by MSMEs in relation to end-user safety, savings culture, new forms of crime or crime mutation, security, impulse buying and MSME management which may impact negatively on socio-economic development. ICTs have the potential to mitigate and also breed social ills which necessitates a deeper investigation of the impact of IT artifacts beyond the phases of deployment and usage. What ICTs can and cannot do matter equally in relation to both unintended and intended ways, thus placing a premium on a research process in which theory is developed to demonstrate why and how the emergent outcomes may occur, how they may be holistically examined and their possible socio-cultural and economic implications for the stakeholders at micro, meso and macro levels of the social context that anchors the research phenomenon (Orlikowski & Iacono 2001, p. 132).

When viewed from the perspective of MSMEs' risks and vulnerabilities the unanticipated consequences might prove to be more dominant than the intended ones and have far-reaching implications for the government regulators, technology vendors and or IS designers in the selected research space (Duncombe, 2006; Moyi, 2003).

Traditionally, there has been a divide between technocentricists on one hand and institutionalists on the other with the latter focusing less on ICTs and emphasizing the evolution of social structures within human institutions (Finlay, 1987). Institutionalists take issue with the technocentrism of decision theorists who view technology as having inherent power to shape human cognition and behaviour, a view likely to lead to what is described as "*gadgetphilia*," where technological artifacts are overemphasized while the social practices they evolve get less focus (Finlay, 1987).

Human as well as institutional entities including designers and vendors, MSME owner/managers as end-users, regulators and policy-makers are involved in the design, testing, deployment, usage and subsequent customizations of mobile banking solutions. Therefore, this thesis employs an analytical model that integrates the perspectives of both institutionalists and decision theorists (Gladwin, 1989a; Orlikowski, 1992). An integrative perspective is deemed appropriate since mobile banking applications, being ubiquitous have the potential to shape human interactions and in reciprocation, human social practices possess power to shape or influence their design (cf. DeSanctis & Poole, 1994). Technology is a causal agent of change rather than a determinant of human behaviour and as it has been argued elsewhere human beings employ resources, interpretive schemes, and norms embedded in the broader institutional context to build social constructions of technology (Orlikowski, 1992).

As explained later in section 5.3.2 of chapter 5 the empirical data from the sampled MSMEs in relation to the mobile banking system usage are analysed to identify the temporal, spatial, informational, and transactional value propositions underlying the adoption decisions. The study further describes the implications and or encumbrances of the unearthed usage outcomes on the social structures and social relations existing in the research context (denoted by the dotted lines in figure 1.2).

1.4 Research Objectives, Research Questions, Scope and Assumptions

This study motivates the adoption and use of ethnographic decision tree modeling (EDTM) as a viable IS impact evaluation research methodology (Gladwin & Barlett, 1980). The thesis examines and analyses the designed and emergent consequences of mobile banking usage Kenyan MSMEs and then describes the policy, economic, social-cultural, legal and technological implications of the unearthed consequences. The study seeks to improve our collective understanding of the research phenomena in terms of theoretical conceptualizations and methodological bases (Gregor, 2006).

This study investigates the claim that the emergent and designed consequences may be derived by examining the decision criteria that influence Kenyan MSMEs' to adopt and use mobile banking. As figure 1.2 shows, the consequences loop back to influence the subsequent adoption and usage decisions. The sub-sections that follow describe the research question, scope and the assumptions underlying the study.

1.4.1 Primary Research Question

How do decision criteria evaluated by Kenyan MSMEs when making mobile banking adoption and actual usage decisions give rise to designed and emergent consequences, and how do the emergent and designed consequences influence decision criteria evaluated?

1.4.2 Secondary Research Questions

- (i) How do MSME owners and managers describe the functionality of mobile banking in their own business settings?
- (ii) What choice criteria underlie Kenyan MSMEs' decision to initially enroll for mobile banking service?
- (iii) What choice criteria underlie Kenyan MSMEs' decision to pay a supplier through mobile banking?
- (iv) What choice criteria underlie Kenyan MSMEs' decision to grant a customer's request for mobile banking payment option?
- (v) How are the mobile banking adoption and usage decision criteria enabled and constrained by the social relations and social structures between MSMEs and their

significant social entities?

- (vi) What inferences can be made about the decision criteria in relation to designed and emergent consequences of MSME's adoption and usage of mobile banking and vice versa?

1.4.3 Significance of Research Questions

As earlier indicated in chapter one, this study's theoretical model is based on a supposition that the designed and emergent consequences of mobile banking usage create a context in which Kenyan MSME operators make their usage decisions. This supposition is informed by one of the four main approaches to the analysis of event causation namely 'counterfactual analyses' in which an event A is assumed to be a necessary cause of another event B, if non-occurrence of event A negates the occurrence of event B (Gregor, 2002). The counterfactual approach theoretically anchors what this thesis refers to as the *consequence-decision abstraction*. The consequence-decision abstraction is graphically represented by the nomological net in figure 1.2 which provides the fundamental premise based on which the examination of MSMEs' decision-making processes, potentially uncovers both emergent and designed outcomes of mobile banking usage. It is the contention of this thesis research that human decisions are informed by both visible and invisible things that may be unearthed through a cognitive analysis of those decisions (Gladwin, 1989a).

This study contends that there are potential implications of unintended usage consequences of Kenya's mobile-money innovations on the stakeholders who include the general business managers, legal professionals, IS practitioners and IS researchers etc., described by Iivari (2003) and Alter (2003, p. 624) as the customers and consumers of the IS research results. It is on this premise that some of the sub-questions are designed to generate research outcomes relevant to the practitioner community (Ormerod, 1997). The '*relevance of outcome*' proposition contributes to the IS field's concerted efforts to entrench and affirm the imperative of its socio-political as well as its cognitive legitimacy in terms of moral and regulatory acceptance by the stakeholders in academic scholarship (Benbasat & Zmud, 2003, p. 185).

Moreover, the data collected is used to construct descriptive ethnographic decision tree models that are presumably capable of predicting the group behaviour of MSMEs not included in the initial modeling sample(s) (Gladwin, 1989a). An elaborate step-by-step process is provided in chapters 4 and 5 on methodology and data analysis respectively with a view to show propositionally that EDTM is a cognitive research method that may be used to investigate ICT adopters' behavioural decisions where alternative technology solutions exist (Davenport, 2007). Presumably this study demonstrates the applicability of EDTM as an effective approach for evaluating the quantifiable, tangible as well as the non-quantifiable and intangible impact and or benefits of ICTs deployed in poor regions to spur development (Gomez & Pather, 2011). In development-oriented ICT4D evaluation paradigms, variables of economic growth are often reverted to owing to the simplicity of dealing with numbers. But not every outcome is enumerable, visible or tangible (Gomez, 2008).

1.4.4 Research Assumptions

This study conceptualises mobile banking as an important phenomenon within the ICT4D research programme particularly because of its assumed potency to enable financial inclusion of the unbanked poor (Mas & Kumar, 2008).

1.4.5 Research Scope

Although this study reckons that mobile banking technology is a valuable mobile commerce innovation for all the population strata in the wealth pyramid (Kiringai et al., 2010), it nonetheless delimits its scope to primarily focus on the decision criteria underlying Kenyan MSMEs' decisions to adopt and use mobile banking.

1.5 Research Map

This section outlines the research path followed.

1. Research Background and Motivation: Chapter one introduces the study and discusses its motivations. The chapter outlines the research problem, research objectives, research questions, assumptions and scope of the study.

2. Contextual Background and Literature Review: Chapter 2 discusses the research context and explores the existing mobile banking research literature to highlight the knowledge gaps.
3. Theoretical Elaborations: Chapter 3 discusses the theoretical framework used to view the interactions among institutional actors within the research context in relation to the research phenomenon. The chapter particularises the concepts of structuration theory in the research context. The chapter further outlines the theory of real life choice as a lens for making sense of the cognitive processes underlying the MSME operators' adoption decisions.
4. Research Methodology: Chapter 4 describes in detail the research philosophy, the research approach and empirical activities. The chapter also offers an in-depth meta-analysis of EDTM methodology.
5. Data Collection and Analysis: Chapter 5 presents a detailed descriptive data and decision analysis. The initial adoption decision and two actual usage decisions are analysed in terms of their underlying decision criteria.
6. Discussion of Findings and presents the study's derived theory. Chapter 6 interprets the findings of the study and makes inferences from both EDTM and structuration theory perspectives. The chapter further formulates some propositions that may be taken up in a future research program.
7. Contribution to Knowledge and Concluding Remarks: Chapter 7 evaluates and discusses the study's theoretical, methodological and practical contributions to the IS and ICT4D body of knowledge.

Chapter 2: Contextual Background and Literature Review

Chapter two profiles Kenya's socio-economic, political as well as technological trends and perspectives that have positioned her within the forces and processes of globalization, followed by a meta-analysis of extant literature to show the persistence and relevance of the research problem.

2.1 Background Information on Kenya

Kenya is a developing country located in the East African region. Like many other countries in Sub-Saharan Africa, Kenya underwent a major ICT revolution during the first decade of the new millennium (Kiringai et al., 2010). Kenya's ICT revolution is best conceptualised through the lens of the threefold technology transformations of mobile phone subscriptions, mobile banking innovations and the Internet usage that have taken place over the past decade. The growth is significant when viewed in light of the short time span during which it has taken place (Kiringai et al., 2010). ICT4D literature and practitioners' treatises conjecture that Kenya's rapid uptake of mobile technologies over the past one and a half decades was initially triggered by the enactment of the Kenya Communications Act of 1998 which was intended to reform the operations of the state-run Kenya Posts and Telecommunications Corporation (KPTC) (Kiringai et al., 2010). The Act split the monopolistic parastatal into (i) Postal Corporation of Kenya (PCK), the state-run body corporate that provides the country's postal services (ii) Telkom Kenya Limited (TKL), a fixed line services state corporation and (iii) Communications Commission of Kenya (CCK), the state-run regulator of the telecommunications sector. Creation of these entities was both a departure from an overly strict state regulation of the telecommunications sector and a transition to an environment of initially negatively perceived deregulation, that was later embraced as the legal misstep that birthed the country's expansive mobile finance platforms (Kiringai et al., 2010; Weber & Darbellay, 2010). CCK has constitutional powers to regulate the ICT sector and adjudicate on matters relating to tariff control, issuance of broadcasting and telecommunications operator licences, consumer protection, dispute resolution, and fair competition and inter-network connectivity inter alia. By aiming to protect consumers without stifling innovation, the

seemingly ‘permissive regulation’ set the stage for Kenya’s ICT revolution by inadvertently creating a highly competitive telecommunications sector that has seen several mobile money solutions including M-PESA, M-KESHO, M-SHWARI among others rolled out, either independently or as joint ventures between mobile network operators (MNOs) and financial institutions (Kiringai et al., 2010).

Available empirical evidence indicates that Kenya has the largest mobile-money platform globally and that Safaricom Kenya Limited has over 18 million M-PESA subscribers who execute over 270 mobile payment transactions per second (CCK, 2012). Available statistics put the total amount of mobile phone deposit transactions at more than Ksh 672 billion annually in a country whose total cell phone subscriptions exceed 29.3 million (CCK, 2012). Some Kenyan financial institutions have also entered into partnerships with mobile network firms that provide the network infrastructure over which additional financial services are deployed to individuals and businesses in a manner that has irreversibly changed Kenya’s financial services market (Jack et al., 2010; Ngugi et al., 2010).

For decades vast sections of the Kenyan society remained unconnected to telecommunications services owing to low fixed line teledensity. Accordingly, cell phones were extensively embraced as a communications device when the pay-as-you-go subscription model was introduced in Kenya in 2007 by Safaricom Kenya Limited. Besides, many poor people had no access to formal banks. For a couple of years Kenyans witnessed leading banks closing down branches and withdrawing from key towns to cut costs thereby making financial services inaccessible to the country’s constituency of the poor and needy (Jack et al., 2010). Due to lack of access to formal banks, the cell phone was also embraced as a banking channel and as a form of wallet in Kenya by all sections of the country’s population (Demombynes & Thegeya, 2012; Haas, Plyler, & Nagarajan, 2010). In light of Patton’s (2002) view of impact research, mobile banking may be viewed as an ICT4D intervention with potential to mitigate the socio-economic problems of financial marginalization of the unbanked and under-banked poor and consequently alleviate the attendant societal problems of poverty, crime, insecurity, political tensions and demoralization (Mansell, 1999; Schoombee, 2004).

Despite the temporal, spatial, informational and transactional benefits cited by vendors and providers when advertising mobile banking services such as funds transfer, balance enquiries, bill payments, statement requests, credit and investment services etc., not all Kenyan MSMEs have adopted such technologies (Mbogo, 2010). Moreover, in spite of the wealth-creation potential inherent in mobile banking as seen from a macroeconomic perspective, the intended and unintended socio-economic and socio-cultural outcomes that accompany these services may be, to use the words of Mansell (1999), ‘demonstrably disruptive’ for the citizens of the developing countries. Such outcomes may be tangible and quantifiable or intangible and thus unquantifiable (Gomez, 2008; Gomez & Pather, 2011). For instance, mobile banking technologies have made financial services more accessible to many Kenyans on one hand, while on the other hand the mediating mobile money transfer agents who form a vital part of the service delivery infrastructure and their customers have become easy targets for criminal attacks, with some operators losing their lives. This is not surprising because stalls, kiosks and shops do not have armed security like the brick-and-mortar banks (Donner, 2007).

Disbursement and repayment of small loans via mobile phones which was experimental back in 2007 in Kenya is now a financial reality. Banks and microfinance institutions are now delivering financial credit to both individual borrowers and MSMEs via cell phones (Donner & Tellez, 2008; Duncombe, 1999). It should be pointed out however, that the design of Kenya’s regulatory regime has made it possible for mobile phone financial services to be provided through two infrastructural models (Anderson, 2010; Ngugi et al., 2010). The first one is the non-bank-led model which is a mobile-money delivery infrastructure linking up mobile network operators (MNOs) and their network-registered agents. The non-bank-led model is based on the Short Message Service (SMS) protocol which is a store-and-forward technology (Peevers et al., 2008; Rotimi, Awodele, & Bamidele, 2007). The second model is the bank-led model based on the Unstructured Supplementary Service Data (USSD) technology that allows commercial banks, savings and credit cooperative societies (SACCOs) and microfinance institutions (MFIs) to provide proprietary mobile banking services over the mobile network of a partnering telecommunications firm (Astrom & Svennesson, 1998; Ghezzi et al., 2010). The USSD protocol enables the Global System for Mobile Communications (GSM) mobile phones to communicate with the service provider’s

computers (Mills, 1999). USSD protocol is ideal for designing proprietary mobile banking applications since it is used to send the service text between a subscriber's cellular phone and the mobile banking application in the bank-MNO network (Astrom & Svennesson, 1998). The USSD protocol incorporates the features of SMS technology such as the use of Subscriber Identity Module (SIM) card to support the client's digital identity (Mills, 1999; Routray et al., 2008). However, unlike the store-and-forward SMS-based transactions, the USSD transactions do not last beyond the session and no trace is left on the user's cell phone after the mobile banking service session (Astrom & Svennesson, 1998; Peevers et al., 2008). In this regard the mobile-money service may be viewed as a subsystem of the mobile banking system, but the legislative design of Kenya's mobile financial services has blurred this distinction. The flexibility of Kenya's regulatory framework permits some mobile money services such as M-PESA to be provided solely by mobile network operators (MNOs) while mobile banking services such as M-KESHO and M-SHWARI are provided by banks in collaboration with MNOs. *M-SHWARI* is an interest-earning mobile bank account which gives users the option to borrow a micro-loan against their current savings. A customer registers for and initializes an M-SHWARI account through his or her cell phone without physically going to the proprietary bank which is Commercial Bank of Africa (CBA). M-SHWARI is therefore a joint venture between a bank and a mobile network. *M-PESA* which is wholly owned by Safaricom Limited is a mobile-money system that allows customers to save, withdraw or transfer money through mediating mobile money agents. Because of its vast agent network, M-PESA infrastructure allows its customers to access and operate other hybrid mobile finance platforms such as M-SHWARI. Customers do not earn interest against their savings in M-PESA. M-KESHO is a savings mobile bank account operated by Equity Bank Limited. It has the features of M-SHWARI except that customers do not borrow against their savings. It is exclusively a way to promote customers' savings. Customers can transfer money from their M-PESA account to M-SHWARI and M-KESHO accounts and vice versa.

2.1.1 Vision 2030: Kenya's Development Roadmap

Kenya's national long term development goals are enshrined in a strategic plan that was launched on 30th October 2006 and dubbed 'The Kenya Vision 2030' as depicted in figure 2.1

(Gakuru, 2007; Vision_2030, 2007). The Kenya Vision 2030 is a development blueprint founded on three pillars namely,

- 1) The Economic Pillar, whose aim is to attain and maintain a 10% economic growth over a period of 25 years ending in the year 2030.
- 2) The Social Pillar, whose goal is to create a just and cohesive society in which all citizens equitably enjoy social development in a clean and secure environment.
- 3) The Political Pillar, aimed at creating an accountable democratic system that is issue-based, people-centered and result-oriented.

Kenya Vision 2030 envisages access to ICTs as having the potential to enhance the creation of a knowledge-based economy in which individual and business participation and productivity is ICT-driven.



Figure 2.1 Kenya Vision 2030, an Abridged Version (Sourced from Kenya Vision 2030's Website)

Table 2.1 provides some of the socio-economic indicators for Kenya as seen from an ICT4D perspective in line with the Kenya Vision 2030 goals.

Table 2.1 Kenya's Socio-Economic Indicators (ITU, 2013; CCK, 2013; Work Bank, 2013)

Indicator	Count	Source(s)
Population (2013 estimate)	44.35 Million	World Bank 2013
Gross Domestic Product (2012 estimate)	\$44.10 Billion	World Bank 2013
Mobile-cellular subscriptions (June 2013)	30.5 Million	CCK
Mobile-cellular subscriptions per 100 inhabitants (2013 estimate)	70.59%	CCK, ITU
Mobile money subscribers (June 2013 estimate)	24.8 Million	CCK
Fixed (wired) broadband subscriptions (2013 estimate)	57,033	ITU
Fixed (wired) broadband subscriptions per 100 inhabitants (2013 estimate)	0.13	ITU
Internet users (June 2013 estimate)	19.6 Million	CCK
Households with Internet access at home	14.2%	ITU
Households with a computer	10.8%	ITU

2.1.2 Socio-economic and Political Trends

Kenya passed a new constitution in a national referendum in 2009 whose promulgation replaced the previous 8 provinces with 47 counties shown in figure 2.2. The new constitution has effectively set up Kenya's two-tier governing system with clear roles for the national government headed by the president and county governments headed by governors.

Figure 2.2 The Map of Kenya's 47 Counties: (KNBS, 2010)



2.1.3 Demographic Trends

Table 2.2 presents some demographic figures obtained from Kenya National Bureau of Statistics and the United Nations Population Fund. The rapid growth in population has put pressure on the available national resources and has in the recent past prompted the government to embark on population control measures (KNBS, 2010).

Table 2.2 Kenya's National Demographic Trends (KNBS, 2010)

Population Distribution by Sex, Number of Households, Area and Density (Figures Represent all 47 counties)						
	Male	Female	Total	Households	Area in Sq. Km.	Density
Grand Totals	19,192,378	19,417,719	38,610,097	8,767,954	581,309.29	66.42

2.1.4 Mobile Banking Trends

Kenya's socio-economic structures have been significantly impacted by the massive ICT growth witnessed in the last one decade (Kiringai et al. 2010). While it is true that a significant part of the poor and marginalized section of Kenya's population still do not yet have access to a cell phone number, the "access gap" is fast closing. As table 2.3 suggests, the subscription rate has been increasing exponentially while Kenya's voice call rates and cell phone prices have sharply dropped to become the lowest globally. For instance, over the last seven years, post-paid on-net, off-net and fixed network charges fell by 72.5%, 69.6% and 69.6% respectively. The pre-paid on-net, off-net and charges to fixed network on the other hand dropped by 72.8%, 55%, 54% respectively. This empirical observation has been considered in certain practitioners circles to account for the rapid uptake of mobile phone services in Kenya (Kiringai et al., 2010).

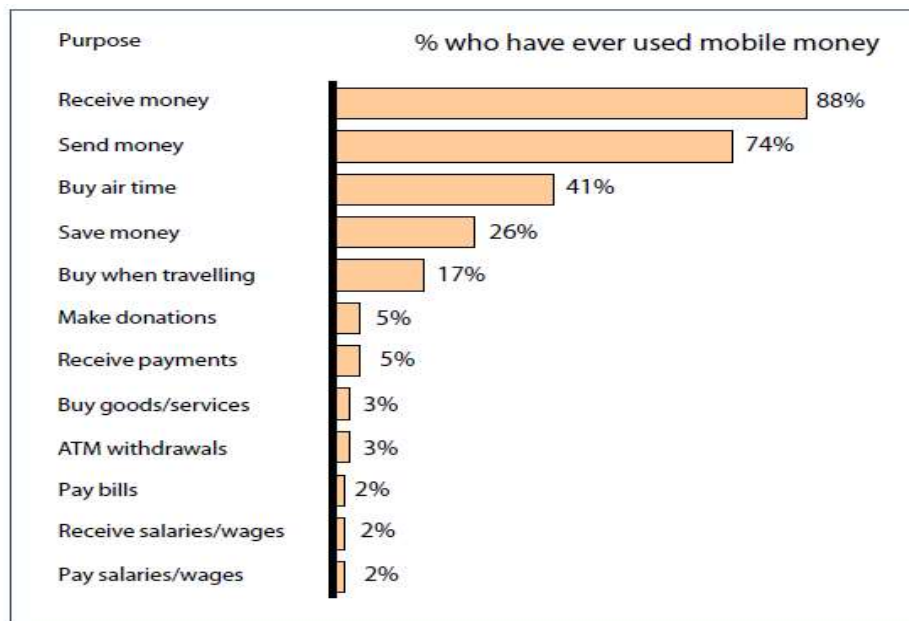
Table 2.3 Average Price of Voice Calls (Ksh per minute) (Kiringai et al. 2010)

		2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
Post-paid	On-net	24	22.12	14.5	10.98	7.05	6.6
	Off-net	27	26.53	23.75	17.68	12	8.22
	Charges to fixed network	27	25.65	23.75	17	11.43	8.22
Pre-paid	On-net	20.67	16.2	10	8.58	5.34	5.62
	Off-net	27.33	26.53	19.5	13.28	12.19	12.31
	Charges to fixed network	26.78	26.53	19.5	12.51	11.34	12.31
Average	On-net	17.5	19.16	12.25	9.78	6.195	4.78
	Off-net	24	26.53	21.625	15.48	12.095	10.265
Average	Charges Mobile Network	20.75	22.845	16.9375	12.63	9.145	7.5225
	Charges to fixed network	24	26.09	21.625	14.755	11.385	10.265

Apart from local remittances, table 2.4 indicates that cell phones in Kenya are used for many other purposes such as purchasing airtime, accumulation of savings, making donations,

receiving payments in business transactions, buying goods and services, paying bills as well as making ATM withdrawals through ‘PesaPoint’ kiosks strategically located in places such as gas stations, shopping malls and busy restaurants.

Table 2.4 General Uses of Mobile Banking Systems (Kiringai et al. 2010)



Before the advent of mobile-driven remittances, the transfer or net flow of funds from wealthier areas to the poorer rural places was via public service transport or *matatus*, or ‘Postapay’ system of the Postal Corporation of Kenya (Kiringai et al., 2010).

In terms of cell phone density, Kenya has effectively kept pace with other leading countries in Sub-Saharan Africa. Table 2.5 places Kenya’s cell phone density of 71.89 at fifth position ahead of Nigeria but still lagging behind South Africa’s 134.80, Ghana’s 100.28, Senegal’s 87.51 and Zambia’s 75.81. Seen through the lens of less than 1 in a 1000 citizens having access to a cell phone service in 1999 and the 21 million active cell phone subscriptions in 2010, this adoption is arguably phenomenal and warrants some investigation (Kiringai et al., 2010).

Table 2.5 Mobile-Cellular Telephone Subscriptions per 100 Inhabitants (ITU, 2013)
Source: <http://www.itu.int/en/ITU-D/Statistics/>

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Cameron	0.66	2.60	4.28	6.42	8.92	12.83	17.47	24.72	32.84	41.74	44.07	52.35	64.04
Ethiopia	0.03	0.04	0.07	0.07	0.21	0.55	1.14	1.55	2.46	4.99	8.26	16.67	23.72
Ghana	0.68	1.24	1.92	3.86	8.03	13.28	23.49	33.48	49.73	63.42	71.49	84.78	100.28
Kenya	0.41	1.87	3.61	4.71	7.34	12.95	20.09	30.28	42.40	49.07	61.63	67.49	71.89
Nigeria	0.02	0.21	1.21	2.37	6.71	13.29	22.55	27.49	41.81	48.24	55.10	58.58	67.68
Rwanda	0.48	0.77	0.95	1.48	1.52	2.42	3.33	6.54	13.22	23.56	33.40	40.63	50.49
Senegal	2.63	3.09	5.52	7.60	10.60	15.91	26.70	31.64	45.72	57.00	67.11	73.25	87.51
South Africa	18.63	23.77	29.78	36.16	44.13	71.06	82.06	86.60	91.24	93.34	100.48	126.83	134.80
Tanzania	0.32	0.79	1.69	3.53	5.14	7.63	14.05	20.09	30.77	40.14	46.80	55.53	57.12
Uganda	0.52	1.13	1.52	2.91	4.23	4.63	6.84	13.83	27.30	28.99	38.38	48.38	45.92
Zambia	0.97	1.16	1.30	2.20	4.15	8.28	14.16	21.89	28.59	34.63	41.62	60.59	75.81

According to the survey results of table 2.6, Kenya's ICT sector has made great advances since its liberalization in 1999 (CCK, 2012; Kiringai et al., 2010). Despite the advances made however, there is still a wide gap to be covered in Kenya with respect to universal access in voice and data services.

Table 2.6 ICT Access & Penetration for Selected African Countries in 2010 (CCK, 2011)

ICT	Ghana	Kenya	Nigeria	South Africa	Tanzania	Uganda
GDP per capita, PPP (current international \$)	1,562	1,573	2,203	10,278	1,362	1,217
Mobile cellular subscriptions per 100 inhabitants	71.49	61.63	55.10	100.48	46.80	38.38
Internet users per 100 inhabitants	8.55	20.98	28.43	12.30	11.00	12.50
Fixed broadband subscriptions per 100 inhabitants	0.21	0.01	0.06	1.48	0.01	0.06

The ICT sector's rapid growth especially in mobile broadband penetration has placed Kenya on a path to become one of the leading ICT countries in Africa in terms of coverage and innovation. Table 2.7 is an analysis of Kenya's rural-urban population's access to ownership and usage of cell phones, fixed telephone lines and internet connection (Berkoben, 2011; K. CCK, 2011).

Table 2.7 indicates that a mobile phone is accessible to 83.9% as opposed to a paltry 4.7% fixed line and 12.6% internet accessibility. The low teledensity perhaps explains why the cell phone has been greatly embraced by many Kenyans.

Table 2.7 Percentage of Rural-Urban Population with Access to Mobile Phone, Fixed Telephone and Internet Connection (CCK, 2011)

	ICT Component	No	Yes	Total
Rural	Mobile Telephone	21.2%	78.8%	100%
	Fixed Telephone	97.1%	2.9%	100%
	Internet	93.5%	6.5%	100%
Urban	Mobile Telephone	5.4%	94.6%	100%
	Fixed Telephone	91.7%	8.3%	100%
	Internet	74.3%	25.7%	100%
Total	Mobile Telephone	16.1%	83.9%	100%
	Fixed Telephone	95.3%	4.7%	100%
	Internet	87.4%	12.6%	100%

Table 2.8 suggests that 56.6% of rural Kenyans own a cell phone as opposed to 75% urban mobile phone owners.

Table 2.8 Main Place of Access to Cell Phone, Fixed Telephone and Internet (CCK, 2011)

Figures based on a subpopulation that has access to the service

	ICT Composition	Own house	Friend's house	Office / Work	Payphone / booth	Cybercafé	Community Centre	Educational Centre	Own mobile	Other	Total
Rural	Mobile telephone	29.6 %	11.9 %	0.1 %	0.1 %	0.9 %	-	-	56.6 %	0.9 %	100%
	Fixed telephone	17.8 %	8.2 %	36.6 %	33.6 %	-	-	-	-	3.8 %	100%
	Internet	10.4 %	3.5 %	15.8 %	-	39.4 %	2.7 %	5.8 %	19.9 %	2.4 %	100%
Urban	Mobile telephone	21.1 %	3.2 %	0.3 %	0.5 %	-	-	-	74.8 %	0.0 %	100%
	Fixed telephone	47.1 %	2.8 %	31 %	23.8 %	-	-	-	-	0.8 %	100%
	Internet	19.8 %	1.1 %	22.8 %	-	36.9 %	0.9 %	3.5 %	14.7 %	0.3 %	100%
Total	Mobile telephone	26.5 %	8.8 %	0.2 %	0.8 %	-	-	-	63.2 %	0.6 %	100%
	Fixed telephone	31.8 %	5.0 %	33.3 %	27.8 %	-	-	-	-	2.0 %	100%
	Internet	16.7 %	1.9 %	20.5 %	-	37.7 %	1.5 %	4.3 %	16.4 %	1.0 %	100%

As table 2.9 reveals, internet and fixed telephone are the least owned ICT communication systems with 6.3% and 1.7% only reportedly having own access.

Table 2.9 Percentages of Kenyan Households that Own Mobile Phone, Fixed Telephone and Internet Connection (CCK, 2011)

	ICT Component	No	Yes	Total
Rural	Mobile Telephone	33.0%	67.0%	100%
	Fixed Telephone	99.9%	0.5%	100%
	Internet	97.1%	2.9%	100%
Urban	Mobile Telephone	10.5%	89.5%	100%
	Fixed Telephone	96.1%	3.9%	100%
	Internet	87.4%	12.6%	100%
Total	Mobile Telephone	25.1%	74.9%	100%
	Fixed Telephone	98.3%	1.7%	100%
	Internet	93.7%	6.3%	100%

2.2 A Review of ICT4D Initiatives and MSMEs

ICT4D is a multidisciplinary field that brings academic scholars and development practitioners together in a research project that seeks to examine the potential role of ICTs in the practice of development (Zhao 2008; UNDP 2010). ICT4D is a framework that aids the identification and application of appropriate ICT innovations to various dimensions and measures of human development. Among ICT4D researchers, the term ‘development’ is regarded as the process of creating conditions that help to expand people’s freedoms and choices as well as improve their quality of life through empowerment and participation (UNDP, 2010). For instance, mobile technologies are seen as ways to ameliorate if not eliminate the effects of alienation of the poor people from mainstream banking and financial services (Dermish et al., 2011).

Contrary to other organizational aims of ICTs where the goal is primarily to enhance realization of organizational goals such as reducing operating costs so as to increase profits, the ICT4D project aims to execute a profoundly moral agenda whose fundamental objective is to empower the poor people and communities by seeking to answer the question of what should be done and how it should be done (Unwin, 2009a; Unwin, 2009b). From a developmental perspective ICTs have the potential to enhance capabilities of the target people

groups to access knowledge that consequently aids them to make better judgments. For example, ICTs may enable the poor to overcome informational limitations that restrict and or distort consequential judgments (Hamel, 2010). ICT4D practitioners hold the view that ICTs by themselves cannot change peoples' lives and that it is the actual usage of such technologies that ultimately empowers people (Gerster & Zimmermann, 2007). When deploying ICTs to foster development therefore, the focus should be on human development rather than on mere installation of technologies (Walsham, 1993).

2.2.1 Importance of MSMEs in Developing Countries

Although there is a well-researched concurrence on the developmental role that they play, MSMEs represent a very heterogeneous group in terms of their definitions and conceptualisations (Bannock, 2005). Different definitions of what constitutes an MSME in the developed, transitioning and developing economies exist but they are largely based on similar variables such as the number of employees and sales turnover (European Commission, 2011).

This study conceptualises MSMEs as follows: micro enterprises: 1–9 employees; small enterprises: 10–49 employees; and medium enterprises: 50–249 employees (Khrystyna et al., 2010). MSMEs play a pivotal role of complementarity in relation to the operations of large firms such as the supply of raw materials, providing distribution channels to remote locations and offering post-sales service (Bannock, 2005). For instance, the manufacture of building materials and major construction work is likely to be the domain of large firms, but renovations and repairs remain the responsibility of small businesses (Bannock, 2005). Thus MSMEs contribute to technological innovations which consequently enhance job creation efforts (Barth et al., 2011). MSMEs also provide market diversification by widening the demand base for locally produced goods and services (Gupta & Wilton 1988), import substitution and poverty reduction (Ozigbo, & Ezeaku, 2009; Washington, 2006).

Accordingly, the Kenya government and the country's commercial banks have made great inroads into the MSME sector, with the former introducing a turnover tax and the latter aggressively offering financial, credit and banking services to MSMEs. Since MSMEs are key enablers of socio-economic development, their choice as the focal point situates this study

within the ICT4D research agenda (Duncombe, 1999; Heeks, 2008; Khrystyna et al., 2010)). Empirical evidence also indicates that Kenyan MSMEs are a key consumer of mobile banking technologies (Mbogo, 2010).

2.2.2 Vulnerabilities of MSMEs in Relation to ICT Adoption

MSMEs encounter a myriad of setbacks that limit their role in economic development. The setbacks include lack of organizational capabilities, poor management, short-term vision and orientation, and informal decision-making processes, inadequate resources including shortage of trained and experienced personnel as well as lack of market intelligence (Okpara & Kabongo, 2009). MSMEs provide an important market for ICT applications but they lack capacity for technological innovation (McAdam et al., 2004). Given their perceived high risk, high transaction costs and lack of appropriate corporate structures and information asymmetries, MSMEs exhibit limited capacity to access funds (Kyobe & Scala, 2000).

Despite the many vulnerabilities cited in the above paragraph, ‘enterprise density’ which is a demographic variable referring to the number of self-employed people in the population usually takes a higher value in developed, developing and transition economies (Bannock, 2005; Garengo & Bernardi, 2007). Weaknesses of MSMEs including lack of appropriate corporate structures, small start-up capital and ease of entry and exit are also seen as their strength since they can be started and closed at will after they have served their purpose (Mukras, 2003). This further necessitates an investigation of the transformational role of mobile financial transactions in the light of these limitations.

2.2.3 Adoption of ICT in African MSMEs

The trends of globalisation which is defined by Anthony Giddens as, ‘*the intensification of the worldwide social relations which link distant localities in such a way that local happenings are shaped by events occurring many miles away and vice-versa*’, presumably underpin the rapidity with which businesses in developing and transition economies are adopting ICTs (Giddens, 1990a). In chapter one, it was stated that African MSMEs unlike their counterparts in the developed world, do not necessarily adopt ICTs to take advantage of opportunities provided by the trends of liberalization and globalisation. Rather, African

MSMEs adopt ICTs albeit in a small way in order to mitigate the vulnerabilities outlined in section 2.2.2 or simply to comply with government regulations (Kyobe & Scala, 2000). With regard to mobile banking, perceived benefits such as convenience, security, vendor support, time and space independence as well as accessibility in areas not reached by traditional bank networks, also play an influencing role (Cruz et al., 2010).

Notably, MSMEs and other economically marginalised and socially excluded persons in developing countries have embraced the use of mobile banking technology for reasons such as the deep penetration of mobile networks into the African rural settings with consequent accessibility to mobile banking services (Duncombe & Boateng, 2009; Goodman & Harris, 2010; Kabukuru, 2010), perceived convenience; affordability of mobile phones resulting from increased competition among MNOs (Amin et al., 2006; Mbogo, 2010; Waema, Adeya, & Ndung'u, 2010), reduced vulnerability to fraud unlike computer-driven banking (Herzberg, 2003; Morawczynski & Miscione, 2008); the quality aspects of cell phone banking such as service, application, transaction and payment quality (Brown et al., 2003). These studies corroborate the findings of earlier research regarding the socio-economic development opportunities that are availed by mobile technologies especially to the unbanked poor (Lyons & Scherpf, 2004; Prescott & Tatar, 1999).

2.3 Challenges of Mobile Banking as a Form of Mobile Commerce

From a legal and economic perspective, mobile commerce refers to the transfer of ownership or rights to use goods and services that is initiated and or concluded by gaining access to computer-mediated networks through mobile devices such as cell phones and personal digital assistants (Liang & Wei, 2004). Mobile banking is distinguished from other mobile commerce applications by its monetary transaction aspect (Tarasewich, 2003). But even then, most commercial banks have not adopted the disbursement of loans through mobile phones unlike their microfinance counterparts (Kiringai et al., 2010).

2.3.1 Difficulties of Prudential Supervision of Mobile Banking

Practitioners who are charged with formulation of regulatory regimes contend that the greatest challenge facing mobile banking services has to do with regulation as opposed to the

logistical issue of interoperability (Kiringai et al., 2010). Regulators and policymakers are faced with the duo-question of how to balance safety measures with innovation-driven growth. This has made the design of a protectionist policy that creates room for further innovation a more challenging dichotomy.

In addition, the notion of human intentional action giving motion to lifeless money is articulated by the economics sociologist, Joseph Alois Schumpeter, who contends that money in itself ‘*lacks the organ of locomotion but flows in response to decisions made by economic units such as a consumer, a business firm, a government or a financial institution*’³(Festré & Nasica, 2009). The preceding citation brings to the fore the challenges of financial transactions.

Schumpeter, the father of modern economics and the architect of the theory of economic sociology, further explicates the concept of innovation as an economic decision where a firm applies an invention or an act of intellectual creativity to produce a new combination of means of production, that is, a change in the factors of production or inputs to produce products or outputs (Collins, 1992). Viewed in this light, diffusion of the resulting technological innovation necessarily triggers a chain of decisions at different structuration levels such as policymakers’, vendors’ and user levels. Innovations are thus conceptualised as occurring in discrete bursts of “creative destruction” by which innovators episodically disrupt the periods of relative stability in a business. In Schumpeter’s (1912) words,

“Innovators are ‘unternehmergeists’ or wild spirits who conjure up new, creative ways to combine existing resources. These novel combinations of means of production threaten the status quo and rapidly advance social welfare as businesses adjust to the new paradigms” (Festré & Nasica, 2009)⁴.

³Festré & Nasica (2009) citation of Schumpeter’s (1912) is provided since the latter could not be found.

⁴

In light of Schumpeter's claim, the advent of mobile banking systems in Kenya has created turbulence in the social system under study that requires a critical focus. Initially, commercial banks lobbied the Kenya's Central Bank to intervene because they felt threatened by the mobile telecommunications firms as new entrants into their line of business and therefore petitioned the government and regulators to deny issuance of licence, to suspend and or withdraw operating licences from the mobile network firms. New partnerships have been created as some financial players forge new alliances with mobile network firms to add value to their existing line of banking and financial products (Festré & Nasica, 2009; Mayhew, 2010; Shionoya, 2004). Further, socioeconomic gaps have become imminent as innovators and first adopters reap windfall benefits while late majority and laggards incur irrecoverable windfall losses (Rogers, 2003). New forms of interdependencies among individuals and businesses have also emerged. The emergence of new forms of businesses is an empirical observation. For instance, mobile airtime and mobile payment agents are small businesses that are a part of the delivery infrastructure of the mobile banking systems.

Both IS researchers and practitioners have highlighted the lack of a supervisory regime to govern the mobile finance. Existence of gaps in prudential management of mobile banking services are evident in that the national regulators assume that mobile banking merely relates to idea of delivering banking services electronically through mobile devices (Weber & Darbellay 2010, p.136). Thus the banking regulatory agencies base the design of supervisory and regulatory frameworks more on the target banking activities and less on the mobile technologies as delivery channels. This creates serious gaps in relation to financial data security and consumer protection occasioned by use of mobile devices that necessitate an inquiry.

2.3.2 Hindrances to Mobile Banking Adoption by MSMEs

The IS research landscape is awash with empirical evidence that MSMEs are late adopters of advanced conventional IT systems compared to the big companies globally (Zhang, Li & Ziegelmayer, 2009). However, the convergence of information technology and telecommunications technology has spawned a new taxonomy of ICT innovations referred to

as the mobile commerce applications and reversed the ICT adoption trends observed among MSMEs.

Extant literature suggests that many MSMEs in Africa have embraced the use of mobile phone technologies. These new adoption trends have been observed in Botswana (Duncombe, 1999; Puzo & Chard, 2001), in South Africa (Brown et al., 2003; Ivatury & Pickens, 2006), in Malawi (Saidi, 2009), Uganda (Duncombe & Molla, 2006), in Kenya (Mbogo, 2010), in Nigeria (Ayo et al., 2007) as well as in the transition economies (Ali et al., 2010; Cruz et al., 2010; Kim & Park, 2010). The International Telecommunications Union (ITU) estimates that in Sub-Saharan Africa one in three Africans now owns a mobile phone which is indicative of massive adoption of the mobile technologies (Gray et al., 2008). Africa, though previously described as the least wired region in the world is now home to over half a billion active mobile phones, the highest globally, hence the need for impact assessment studies (Asongu, 2012; Molony, 2007; Porter, 2012).

2.3.3 Benefits of Mobile Banking Tempered With Caution

Although mobile phones and related technologies including mobile commerce applications like mobile banking have been embraced as good news for developing and transition economies, a number of inquirers are quick to simultaneously sound caution bells (Deng, Lu, Deng, & Zhang, 2010; Ghezzi et al., 2010; Koenig-Lewis, Palmer, & Moll, 2010). Goodman & Harris (2010) argue that massive adoption of mobile phone technologies such as mobile banking in Africa might present significant security challenges including identity theft, electronic surveillance, and susceptibility of cell phones to both physical and software-based attacks. The authors paint a grim picture that is worth investigating as they gravely describe the looming catastrophe as “*the coming African tsunami of information security*”.

Inadequate, untested and or absence of cyber laws in relation to ICT adoption in African countries has been cited as courting electronic disaster in relation to Business Process Outsourcing, hence the need and urgency to enact cyber laws. The need for urgent enactment of cyber laws in Kenya has been highlighted (Ng'ang'a, 2009). The reality on the ground is more complicated than the perceived good of the ubiquitous mobile technologies seen in

literature (Goodman & Harris, 2010). This creates in us a sense of existing potentiality and a looming and likely catastrophe. Summed up by the statement '*it's good but can be devastating*', the multi-faceted risk uncertainties underscore the need for an inquiry into both designed and emergent consequences of mobile banking usage among MSMEs. Empirical findings will be useful to both researchers and practitioners in devising cyber laws to guarantee best practice and ensure that the seemingly beneficial mobile banking technology does not itself become the extinguisher or terminator of the very economies and lives it seeks to advance (Molony, 2007).

A dark shadow is also cast by a paradox where increasing mobile technology penetration in Sub-Saharan Africa is marched by declining GDP trends which stood at 7% in 2007, 5.8% in 2008 and was estimated to drop to 3.5% in 2009 and 2010 (Beck & Demirgüç-Kunt, 2008). Ordinarily, drivers of economic growth go hand-in-hand (Beck et al., 2008). For instance, countries where more people own and use mobile phones have higher literacy levels, better health care systems and more advanced education systems. Procurement of more sophisticated and smarter mobile phones with sufficient functionality to support mobile commerce applications may arguably divert resources from more productive spending.

2.3.4 Mobile-Aided Crime Mutation

Unlike the famous 'shoulder attack' in which victims are knocked down and robbed of cash and other valuables, criminals are known to hijack and drive their victims to traditional ATMs forcing them to withdraw money in a daring but risky attack that exposes them to law enforcers. Besides, traditional ATMs in isolated areas are also vulnerable to vandalism. To reduce the likelihood of these crimes the brick-and-mortar banks in transition and developing countries usually employ security guards to man the traditional ATMs. To ensure the safety of the service users, some banks install ATM machines in isolated places inside the banking halls making them inaccessible outside business hours. Mobile banking on one hand provides an 'any-time, any-where' service accessibility but introduces another challenge referred to in this research context as '*crime mutation*' that is, the notion of crime mutating into new forms (Kim et al., 2009). The adoption of mobile technologies in the financial services industry has created new forms of threats to both service providers and service consumers (Goodman &

Harris, 2010). The emergent threats are a shift from generic attacks to more sophisticated and well-targeted attacks that are aimed at the integrity rather than the availability of the service (Slewe & Hoogenboom, 2004).

For instance, the nature of mobile banking related threats are known to mutate into new forms of cyber-crime that are too subtle to predict or prevent (Goodman & Harris, 2010; Herselman & Warren, 2004). Mobile banking applications are adopted largely because of their unique functional capabilities such as ubiquity (the “anytime” feature), immediacy (the “anywhere” feature), instant connectivity (the “always on” feature) provided by the Global Packet Radio Service (GPRS), and the simple authentication procedure using the Subscriber Identity Module (SIM card) which is simply registered with the mobile network operator (Tiwari et al., 2006). Good as they may appear, the above properties of mobile banking create new challenges. For instance, instead of criminal gangs taking a hijacked victim to an ATM, they may simply order him or her to transfer funds to their mobile account and withdraw it in the nearest mobile money transfer agent. Emergent forms of mobile phone crime further animate the need to enact mobile cyber laws (Ng'ang'a, 2009).

Mobile banking has benefited MSMEs through disbursement of micro-loans (Mbogo, 2010). However, the massive uptake of the ubiquitous banking in the Kenya has increased incidences of money laundering and underhand dealings such as fraud and violent attacks against MSME operators and mobile-money transfer agents, which were unintended by its designers. Unlike the brick-and-mortar banks, mobile-money transfer agents in Kenya have no armed security, an empirical observation that puts the lives of MSMEs, individual persons, and the agents themselves at risk of violent attacks (Haas et al., 2010). And as Giddens (1984) contends, a seemingly trivial act such as a technological innovation may trigger events far removed from it in time and space leading to policy design complexities. If the consequences of an act such as the mobile banking design and adoption are not co-present in time and space with the original context of the act, they are most likely unintended.

Mobile banking technologies create a fertile ground for cyber terrorism, money laundering and tax evasion (Herselman & Warren, 2004; Ng'ang'a, 2009). The micro nature of mobile

financial transactions is a possible deterrent to mobile-fraud but criminals are not necessarily out for huge figures (Morawczynski & Miscione, 2008). Arguably speaking, permitting only small amounts of mobile payments either through legislation or through regulatory policies creates another limitation for entrepreneurial MSMEs that have outgrown the set limits. Nonetheless, setting a ceiling on the amount of money transferrable per transaction per day may guarantee safety, but the enactment itself might be an emergent form of operational encumbrances in relation to stock procurement in MSMEs.

Besides the metamorphic worms that largely target the availability of information systems, the emergence of polymorphic worms that disguise their appearance to avoid detection has been predicted in the financial service industry. Such destructive agents might use keystroke loggers to capture passwords and identification information after which they may use forged names or documents to fraudulently access credit or financial services (Slewe & Hoogenboom, 2004). As financial institutions continue to collaborate with mobile network operators to provide financial services in developing and transition economies, banking regulators will be obliged to use offensive or penetration security testing over and above the application of defensive mechanisms (Karsten, 2003; Mink & Freiling, 2006). The demand for new security methods is even more crucial given the weak regulatory context of developing countries where destructive agents such as malware placed on mobile devices to bypass password identification systems can wreak irrecoverable damage (Chickowski, 2010; Navale et al., 2010). Although mobile banking makes financial institutions vulnerable to attacks, mobile devices being personal and registered can support a fair allocation of responsibility for fraud (Herzberg, 2003).

The know-your-customer (KYC) principle requires banks to maintain up-to date information about their customers. The gains of KYC principle may arguably be reversed by the social detachment resulting from increased use of mobile banking (Donner, 2007). Social detachment is a critical theme since small businesses prefer personalized financial services perhaps to mitigate their vulnerabilities. Another challenge for governments is that ultimate reduction in national revenue is a possibility as more and more MSMEs and individuals opt out of the mainline commercial banks in favour of mobile banking service with the

consequent result of hindering development for lack of adequate revenue collections. As such, mobile banking usage can lead to desirable and undesirable consequences.

2.4 Mobile Banking Adoption ‘Consequences’ Research

Rogers (2003) defines ‘consequences’ as *‘changes that occur in an individual or a social system as a result of adoption or rejection of an innovation’* (p. 436). Intentional and unintentional actions of social actors produce ‘consequences’ defined as *“the events which would not have happened if an actor had behaved differently, but which are not within the scope of the agent’s power to have brought about, regardless of his or her intentions”* (Giddens 1984, p. 11). The two definitions situate the proposed consequences research within the impact domain of the nomological net (Benbasat & Zmud, 2003). Although the consequences of an act are influenced by the knowledgeability and the power actors are able to marshal, such outcomes are said to be unintended if they are, in time and space, far removed from the original context of the act that is, when they are not co-present with the initiating circumstance (Berg, 1998; Giddens, 1984). Such emergent outcomes may be observed since, knowledgeable human agents may not be able to exercise control outside the immediate contexts of their action or interactions (Bhaskar, 1978). Besides, unintended consequences might be linked to institutionalized social practices if they are deeply embedded in time and space with the trigger events (Giddens, 1984). Knowledgeability of social actors envisaged by structuration theory, is always bounded by both the unconscious and the unacknowledged conditions that create potential for unintended consequences (Giddens, 1984, p. 5). For example, the advent of mobile banking systems provide a set of conditions that may shape the ways of life of its targeted users in a manner not possibly envisaged by designers, vendors or regulators. Merton (1936) describes the studies of unintended consequences as ‘key to sociological enterprise’. In spite of the importance of the consequences of innovations, they have received relatively little study by past diffusion researchers Rogers (2003, p. 436).

Literature on diffusion of ICT innovation indicates that participants in technological innovations are generally more heterophilous than they are homophilous (Rogers, 2003). Heterophilous participants have different beliefs, education, interests and social status unlike

the homophilous participants who share similar attributes. For instance change agents in a diffusion process usually possess far greater knowledge of the specific ICT innovation than the members of the target social system. In tandem with the differences cited among innovation participants, the notion of pro-innovation bias leads to the conclusion that change agents such as development agencies working in concert with mobile networks to diffuse mobile banking innovations, may not tell it all when they outline the expected benefits of a client system. And as Rogers (2003) contends, the analysis of the decision to adopt a technological innovation is a much needed inquiry that has dominated past diffusion research, but going forward researchers should ask how that decision is implemented and with what consequences (Rogers, 2003).

2.4.1 Classification of Innovation Consequences

ICT innovation consequences are partially implicated in their systems analysis and design phases as suggested in the activity theory (Kaptelinin & Nardi, 1997). The activity theory provides that an ICT innovation carries with it the design history or materiality, that is, its historical remains into the context of use. It is during the design phase of the development process that the expected or designed consequences are built into the fabric of the client system, which is the *tool* from the activity theory perspective. Activity theory further provides that human activity such as *decision-making* is mediated by tools in a broad sense, and that tool use influences the nature of external behaviour as well as the mental functioning of individuals (Kaptelinin & Nardi, 1997). It has been argued that the ability to determine the initial goals of a technological innovation with reference to its target social setting might help to categorise its lived outcomes (Rogers, 2003). The next section outlines a classification of consequences of technological innovations.

2.4.2 Desirable versus Undesirable Consequences

The desirable outcomes are those functional effects while the undesirable outcomes are those dysfunctional effects of an ICT innovation for an individual or for a social system. Possible examples are the digital divide among the innovators, first adopters, early majority, late majority and laggards as occasioned by the advent and patterns of their adoption of the Internet (Rogers, 2003). Orlikowski's (1992) eight-month ethnographic doctoral research in a

large multinational corporation reported that the deployed information system increased the level of internal bureaucracy rather than minimise it as expected. The management of desirable and undesirable consequences is especially difficult when viewed in light of the ‘principle of inseparability’, which conjectures that managing ICT innovations at the design phase may be instrumental in that the developer may choose to forego certain advantages to avoid more far-reaching disastrous results. Besides, it is acknowledged in IS literature that the effects of innovations are hard to separate at the adoption phase. This viewpoint necessitates an assessment of the IS deployment consequences and their implications in order to make corrective policy decisions at end-user, vendor and legislative levels (Beck, 2005).

2.4.3 Direct versus Indirect Consequences

Direct consequences are defined as those that are directly and immediately occasioned by an innovation in an individual or social system. However, due to the complex web of interrelationships that are usually present in a socio-technical culture, a change in one part leads to or necessitates a change in another (Rose et al., 2004). The implication here is that direct effects will themselves have ripple effects that are defined as indirect consequences, that is, consequences of direct consequences (Rogers, 2003). For instance, effective communication and receiving important updates is a direct consequence of adoption and diffusion of the email system and subscribing to important informational sources, whereas spam is an indirect consequence of the first outcome.

2.4.4 Anticipated versus Unanticipated Consequences

The ‘anticipated consequences’ are those changes which are recognized and intended by the members of a social system. ‘Unanticipated consequences’ are those changes occasioned by an innovation and which are neither recognized nor intended by members of a social system during the phases of design, deployment and adoption. This study argues that theorising about the relationship between designed and emergent consequences may be more effectively undertaken in the post-adoption phase of ICT innovations.

2.5 Existing Gaps in Literature and Justification for the Study

Despite the wealth created by ICTs from a macroeconomic perspective, the intended and unintended social-cultural consequences that accompany these technologies are, to use the words of Mansell (2009), ‘demonstrably disruptive’ for the citizens of the developing world. This necessitates an evaluation of ICTs to assess their impacts on poor people’s lives. ICT knowledge transfer from the developed to the developing nations requires a mapping exercise where the context and existing infrastructure is documented and a suitable technology is selected over and above planning for sustainability. The IS Success Model, for instance, argues that the nature of IS evaluation is largely determined by the context (Delone, 2003).

In some ICT4D interventions project designers and sponsors hardly collect sufficient data before rolling out the technologies, an oversight that consequently makes it difficult to investigate the direct indicators of ICTs’ impact. The existence of complex and unrelated variables within the development research setting complicates the investigation of consequences. It has been argued elsewhere that much of ICT4D projects yield anecdotal impact that is hard to measure. As such, developmental ICT evaluators are unsure of what they are measuring, a position that leaves them investigating variables of economic growth owing to the simplicity of dealing with numbers (Gomez & Pather, 2011).

2.5.1 Reported Scarcity of Studies of Consequences of ICT Innovations

Several studies have examined the determinants of adoption of mobile banking technology but have given minimal or no attention to its impact on MSMEs. For instance, an analysis of 43 peer-reviewed research articles and other practitioner literature paints a grim picture of the current knowledge on mobile banking technologies (Duncombe & Boateng, 2009). The analysis exposes a neglect of such phenomena as the financial needs of the poor and the evaluation of outcomes of mobile financial transactions by the academic community that has instead given too much focus on design and adoption aspects. Duncombe & Boateng (2009) contend that assessment of the financial needs of the poor as well as measurement of impact have been neglected in favour of application design and adoption studies that have comparatively received greater attention.

A strong collaboration between practitioners and researchers is further blamed for the narrow research agenda on cell phone driven development and the largely atheoretical findings. A further analysis of 200 articles on cell phones comes to a similar conclusion that more research needs to be done on the impact of mobile banking in developing country contexts (Donner & Tellez, 2008). The preceding gaps in the consequences research are perhaps best reflected in figure 2.3 which is a representation of the six main stages of the innovation-decision process (Rogers, 2003).

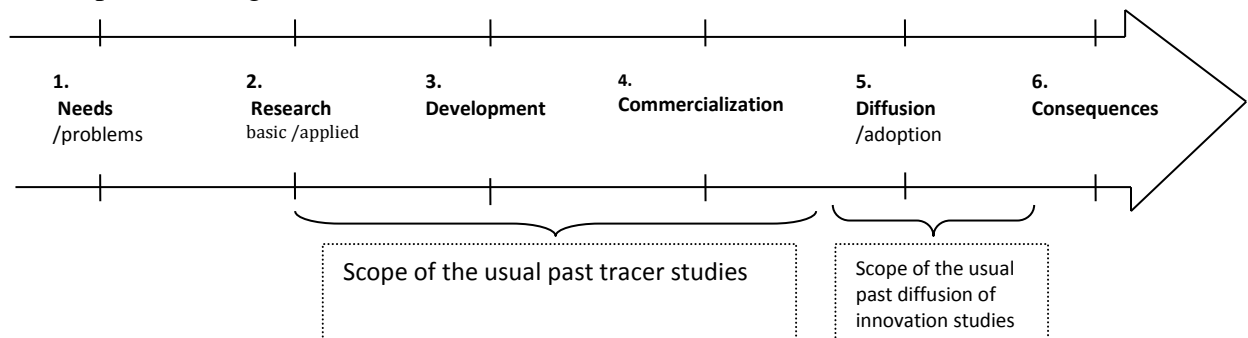


Figure 2.3 Research Scarcity on Consequences of Technological Innovations. Source (Rogers, 2003)

Current IS research is said to lean more on cell phone devices and technology while overlooking the broader context of financial services for the poor (Donner, 2008). A good ICT4D research is germane to the field of IS as a whole and to related disciplines like development studies and globalization processes (Walsham, Robey & Sahay, 2007), an argument that heightens the relevance of the phenomena being investigated by this thesis inquiry.

While acknowledging the great contribution of past research, this study intentionally breaks away from the tradition of strongly focusing on the determinants of adoption and use of ICTs, and instead conducts an in-depth impact assessment of the designed and emergent consequences of mobile banking usage by MSMEs in a developing country context. Walsham et al. (2007) and Thompson & Walsham (2010), separately examine key research literature on ICTs in the African context and note that explicit focus on ‘development’ currently conceptualised as the realisation of Millennium Development Goals is lacking (UNDP, 2010). The authors submit their findings with a call to broaden the ICT4D research agenda on the use of ICTs in the African countries to encompass a stronger strategic developmental focus on transformation areas such as institutional infrastructure, access to global markets and

resources, service and economic production inter alia (Thompson & Walsham, 2010; Walsham et al., 2007). Arguably, ICT4D studies ought to focus on the developmental outcomes of contextually broad and point implementations of ICTs in the developing countries (Thompson & Walsham, 2010).

2.5.2 Conditionalities for ICT Impact Assessment Research

According to Foley's framework for ICT adoption in developing countries, there are four requirements that ought to be satisfied before any real impact can be brought to bear on the targeted end-users of any IT artifact. These include awareness, access, knowledge acquired through training and actual use of an ICT artifact (Chigona et al., 2009). Despite the massive adoption of the mobile banking innovation in Kenya, questions still linger as to which of the above factors have contributed to the empirical observation. The notion of time as a significant factor of translation in the studies of consequences is further implicated in the argument that 'professional change agents cannot know the unanticipated consequences of an innovation until after its widespread adoption has occurred' (Rogers, 2003).

2.5.3 The Role and Place of Getting the Research Purpose Right

Patton (2002) argues that '*Purpose is the controlling force in research*' and further emphasizes that '*decisions about design, measurement, analysis, and reporting all flow from purpose*'. A lack of clarity about purpose or a mid-point deviation from the primary purpose and focus can therefore be said to have the potential to yield results that do not meet the needs of consumers of the research outcome. This perhaps gets clear when viewed from the perspective of alternative purposes of research along Patton's (2002) continuum which is outlined in table 2.10.

Table 2.10 Purpose-Driven Research Approaches (Patton, 2002)

	Category of Research	Purpose of Research	Examples and Implications for Mobile Banking Research
1.	Basic research	To contribute to fundamental knowledge and theory	Designed to generate theory in response to the critiques who contend that much of ICT4D is atheoretical
2.	Applied research	To illuminate a societal concern	Designed to shed light on the plight of the unbanked poor
3.	Summative evaluation	To determine program effectiveness	Designed to empirically examine the effectiveness of mobile banking to mitigate the financial alienation of the poor people in some context
4.	Formative evaluation	To improve a program	Designed to generate findings that would inform the formulation of intervention strategies e.g. acceleration of ICT uptake by the poor
5.	Action research	To solve a specific problem	Designed to bank the unbanked poor in rural setups known to have low teledensity and uncovered by formal financial institutions

A look at the fourth column highlights the possibility of mixing up the purpose where the researcher starts off with one intention and ends up addressing a different purpose altogether. To resolve this paradox of centrality of purpose in research, Patton (2002) classifies research into two broad categories namely *applied research* and *evaluation research* and observes that,

“While applied research seeks to understand societal problems and identify potential solutions, evaluations examine and judge the processes and outcomes aimed at attempted solutions...Evaluators study programs, policies, personnel, organizations and products. Evaluation research can be conducted on virtually any explicit attempt to solve problems or bring about planned change” (p. 218)

From Patton's (2002) argument, it may be inferred that ICTs just like their hosting institutions, human resource component and organizational policies may be subjected to an evaluative inquiry.

Impact studies are either summative or formative (Patton, 2002). Summative evaluations aim to make a decision to discontinue or retain an evaluand (the thing or product or artifact under evaluation) as is if found to be effective, while formative evaluations seek to identify and remove weaknesses so as to improve the evaluand. According to Patton (2002, p. 218), the purpose of summative evaluations is to render ultimate judgment regarding the effectiveness of a program intervention, policy or product. Summative evaluation findings should provide the inquirer(s) with grounds on which to declare the evaluand as effective, ineffective, worthy of continuing or not or even assess its generalizability to other situations. The goal is to make a summative decision (Patton, 2002). Formative evaluations differ from the summative studies in that the former aims to improve a program or policy intervention, or the quality of a product. Accordingly the objective of an evaluation study is to yield findings that give a better form or shape to the 'thing' being examined and therefore disallows generalizability beyond the research context. Patton (2002) thus posits,

"Formative evaluations rely heavily on process studies, implementation evaluations, case studies and evaluability assessments...they often rely heavily even primarily, on qualitative methods"...and that..."findings are context-specific" (p. 220).

Seen in light of the above Patton's (2002) perspective, mobile banking is an ICT4D intervention that practitioners and researchers roll out in many developing country contexts with the hope that it will mitigate the economic problem of financial marginalization of the unbanked poor and consequently address the attendant societal problems such as poverty and associated crime as well as slow social-economic development (Chibba, 2009; Schoombee, 2004).

While acknowledging the importance of impact assessment, Ugo Vallauri, an ICT4D researcher of the Royal Holloway University of London, contends that evaluators should not focus on the direct, tangible and measurable outcomes, so long as there is moral common sense in the ICT interventions themselves that makes them to respond to the needs of the target poor people (Vallauri, 2011). Such projects should be implemented with close collaboration with the stakeholders, Ugo Vallauri cautions adding that even where there are no direct indicators of positive impact, it is necessary to investigate the unintended consequences (Vallauri, 2011).

In the broader business sense, the success of an IS evaluation requires an assessment of its 'hard' aspects about the nature of the technology and what it can do, to be complemented by a simultaneous evaluation of the soft aspects associated with the organizational and social consequences of its adoption and use (Brown, 2005; Smithson & Hirschheim, 1998). Brown (2005) contends that the evaluation of IS prone to high risk of failure which may cause a disillusioned management to view it as a costly and pointless undertaking capable of breeding cynicism and pessimism. Accordingly IS evaluation has been described as a 'wicked problem' (Farbey et al., 1999). Smithson & Hirschheim (1998) further point out that 'IS evaluation is difficult'.

2.6 Conclusion

As Gomez & Pather (2008) argue, there are pertinent theoretical and methodological gaps in the existing ICT4D evaluation frameworks that necessitate a shift from a modernization paradigm, which equates development with economic growth thus making an investigation of intangible and unquantifiable outcomes of ICT4D interventions difficult. In conclusion, therefore, the foregoing literature review highlights a gap in knowledge that necessitates an investigation of the proposed research questions in section 1.4.2 of chapter one to unearth the designed and emergent consequences of mobile finance usage by MSMEs as well as their socio-cultural, technological, economic, legislative, organizational and policy implications for the social actors within the research context who include users, vendors and regulators.

Chapter 3: Theoretical Foundations and Elaborations**3.1 Introduction**

This chapter outlines the theoretical lens chosen to provide theoretical underpinnings for this thesis study and discusses the key concepts and constructs that make the framework arguably appropriate. Comte (1830-1842) explicates the role of theory in scientific research and argues that,

- 1) “No social fact can have any scientific meaning until it is connected with some other social facts” (Comte, 1830-1842, p. 245)
- 2) “If it is true that every theory must be based upon observed facts, it is equally true that facts cannot be observed without the guidance of some theory” (Comte, 1830-1842, p. 4).
“No real observation of any phenomena is possible, except in so far as it is directed and finally interpreted, by some theory” (Comte, 1830-1842, p. 243).

Malinowski & Frazer (1922) point out that good training and acquaintance with theory is pivotal in research and cannot be compared to having preconceived ideas. Unlike the ‘preconceived ideas’ which are ruinous in any scholarly endeavour, ‘foreshadowed problems’ are first captured through theoretical studies and therefore constitute the main attribute of a scientific thinker (Malinowski & Frazer, 1922, p. 9).

3.2 Background and Overview of Structuration Theory

Structuration theory is the culmination of the lengthy work of Anthony Giddens published under the title of ‘The constitution of society’ in 1984 (Giddens, 1984). The theory was born out of Giddens’s dissatisfaction with the following schools of thought about the social subject, object, action and meaning:

- 1) Functionalism, which views organisation of society as more important than the individual (Comte, 1798-1857) and Structuralism, where each part of society is interdependent and contributes to society's stability and functioning as a whole (Clarke, 1978) are two

orientations that lean towards objectivism and emphasize the pre-eminence of the social whole over its individual parts. Such a view gives the structure primacy over human action of which it is seen to constrain. Functionalism seeks to determine the functions or uses of the main ways in which a society is organized (Giddens, 1976). In particular, structuration theory takes issue with functionalist and structuralist views on one hand because they discount the social agent's knowledgeability, reasons, and rationalization of actions, and on the other hand dismisses the 'opposing error of hermeneutic approaches' because they articulate society solely as a skewed creation of human beings (Comte & Martineau, 1896; Dilthey & Betanzos, 1988; Vester, 2009). By discounting the agent's knowledgeability and reason to rationalize action, Giddens (1984, p. 27-28) argues that functionalism erroneously treats the concept of inter-dependence as a 'homeostatic process' akin to the mechanisms of self-regulation operating in a biological organism, which is a "mechanised mode of system reproduction. Giddens (1984) contends that strategically located and knowledgeable actors, (such as MSMEs, banks, MNOs and regulators in this study) usually selectively filter information and use it to either preserve or modify the conditions of reproducing the social system in a process he describes as "the reflexive self-regulation in system reproduction". Thus individual actors play a key role in shaping society (Giddens, 1984).

- 2) Hermeneutic tradition and interpretive sociologies (Dilthey & Betanzos, 1988): Although they are more inclined to structuration theory's assumptions in that they accord primacy to human action and meaning in understanding the conduct of social actors, Giddens (1976) contends that they deny structural concepts their due prominence. The two orientations view the material world as lying outside of the subjective experience and as being governed by impersonal relations of cause and effect (Giddens, 1984). Interpretive sociologies, notes a dissatisfied Giddens (1984) are premised on the imperialism of the subject while functionalist and structuralist orientations are anchored on the imperialism of the social object (Clarke, 1978; Vester, 2009; Weaver & Gioia, 1994). One of Giddens's (1984) principal ambitions in formulating structuration theory is to put an end to the 'empire-building' orientations.

Arguably, structuration theory was born out of Anthony Giddens's motivation to dispel the epistemological as well as the ontological dichotomies and the structural dualities created when either the subject or the object is considered imperial in the enactment of social practices (Giddens, 1984). Structuration theory privileges neither the individual (subject) nor the collective (society) but rather focuses on the flow of social practices across space and time. Structuration theory arguably bridges the gap characterised by the antagonistic debate between the enthusiasts of positivism and the proponents of interpretivism in the past few decades (Fitzgerald & Howcroft, 1998). For example, the argument that society is skilfully produced and reproduced by its members under partially intended and comprehended conditions is seemingly a refutation of the universal social laws or regularities advanced by the positivist tradition (Giddens, 1984).

Many strategies have been proposed over the years to mediate between soft and hard camps including: the supremacist strategy advocating for a universal, single research approach for all kinds of studies (Pfeffer, 1993); isolationism where different research approaches are treated as incommensurable or mutually exclusive opposites that cannot be accommodated in a single research programme (Burrell & Morgan, 1979); integrationist strategy in search of a single coherent mode of analysis born out of combining existing but different approaches (Landry & Banville, 1992); and pluralism in which 'knights of change' as Landry & Banville (1992) call them, advocate the use of different methods that have complementary potentials even if they are drawn from different paradigms (Iivari, 1991; Klein & Lyytinen, 1985). Giddens (1984) supports a flexible approach to research methods.

Accordingly, Pozzebon & Pinsonneault (2001, p. 206) postulate that Giddens (1984) acknowledges and accommodates both subjective and objective views of social reality while assuming a duality of structure and human action. Notably, structuration theory acknowledges the existence of physical objects and organizations (Giddens, 1976).

Figure 3.1 presents the three worlds (our material world, our social world, and our personal world) considered relevant to research methods because they constitute our world and from this seeming extension of Giddens' ontology, it may be inferred that the notion of

structuration does not necessarily negate the existence of the material world which is considered to host aspects of technology (Habermas, 1984; Mingers, 2004; Whitehead, 2004). Mingers (2001 p. 253) conjectures that ‘the interaction between a localised context and the wider social practices and relations of power and the legitimacy that sustains them can be examined using structuration theory. Therefore, MSMEs’ operations and their usage of mobile banking systems create a localised context that interacts with the wider social practices of vendors and designers of mobile banking systems.

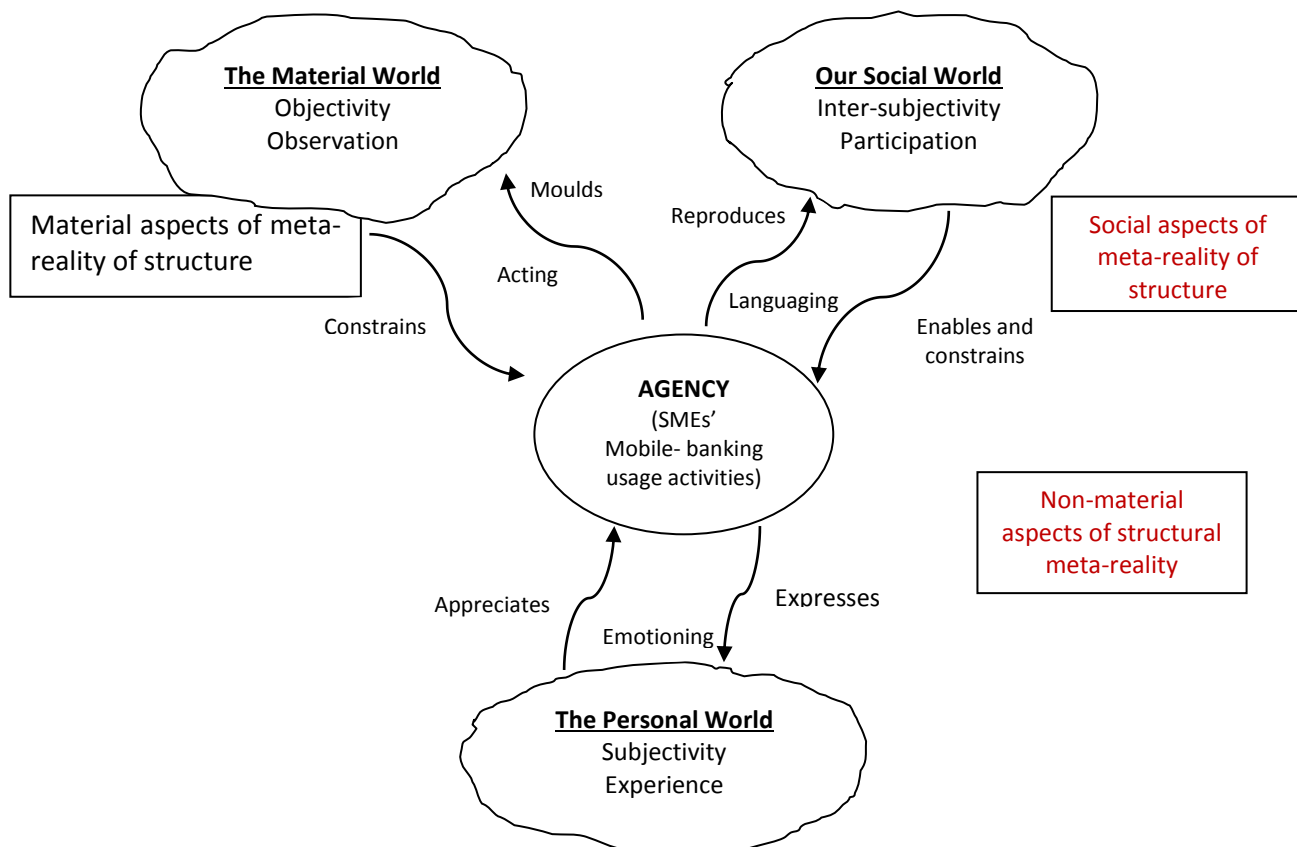


Figure 3.1 Deciphering and Extending Giddens' Structuration Ontology (Mingers, 2001)

Therefore the material, social and personal worlds shown in figure 3.1 together constitute the meta-reality that Giddens (1984) refers to as the structure that is produced and reproduced by the human agency, ‘meta’ because some aspects of this reality are not physical and researchers can only relate with them through research methods that involve inter-subjectivity, participation, subjectivity and experience (Habermas, 1985; Mingers, 2001; Whitehead, 2005). Although *interpretive schemes* may be shared, they need not “constitute a coherent, consistent, uniform, seamless or monolithic belief system” in order to facilitate an

interaction (Boland, 1996, p. 693). For instance, an MSME owner or manager may be able to use only a part of the mobile banking application while totally oblivious of the vast functionality available if no formal training has been provided by the service vendor. Giddens (1984) emphasizes that knowledgeable agents partially rely on their 'mutual knowledge' to 'go-on' in the routines of social life. As such, the stocks of mutual knowledge in structuration theory are arguably comparable to the concept of 'lifeworld' defined as "the lived experiences and beliefs that guide peoples' attitudes, behaviours and actions in their interactions" and seen as consisting of the 'unarticulated and taken-for-granted assumptions, knowledge, culture, beliefs and values' (Habermas, 1981). The lifeworld is elsewhere described as a "frame-of-reference" containing implicit guidelines used by human actors to interpret and enact meanings to events and interactive situations (Erikson & Schultz, 1982). For example, the lifeworld may be referenced by the MSME operator in order to determine the next course of action when faced with a situation such as mobile banking related fraud, loss of money, or network breakdown (Morawczynski & Miscione, 2008). According to Schein (1992), *lifeworld schemes* provide a lens through which social actors observe and interpret the actions of others based on their stratification model and can be compared with Giddens's (1984) *interpretive schemes* that are grounded on the stocks of mutual knowledge and act as modalities to create structures of communication. The organizational context which consists of the lifeworld, organizational structures and work practices is the foundation for construction of shared meanings (Daft & Weick, 1984).

The MSMEs, banks, telecommunication firms, and regulatory agencies exhibit non-homogenous lifeworlds, work practices and organizational structures, making the social system in this study's research context even more complex and thus necessitating the use of a structuration theory to make sense of the social relations and structures implicated therein (Schultze & Orlikowski, 2004).

For the purpose of this thesis study, a mobile banking system which is a fast evolving phenomenon in the Kenyan socio-economic and socio-cultural sphere, is conceptualised as a social structure that is enmeshed in the social-cultural conditions of its use (Orlikowski & Iacono, 2001) and as such the study takes into account its interaction with institutional and

social-cultural context (Kling 2000a; 2000b; 2007). This conceptualization is grounded on the ideas drawn from the theory of structuration in which technology is conceptualised as a set of rules and resources that have been built into the technology by its designers during development and are appropriated by users (in this case MSMEs) as they interact with the technology (Giddens, 1984). According to Rose (1998), the theory of structuration is ontologically designed to be an over-arching meta-theory in a modern liberal-rational tradition of social science thinking where knowledge is assumed to be socially constructed, and the importing discipline has to respect the theory's inherent characteristics.

The appropriateness of structuration theory for this research is further drawn from the meta-analysis work of Jones & Karsten (2008) who postulate that the theory's notion of a dynamic and mutually constitutive duality of structure that is continuously produced and reproduced through knowledgeable and capable human and institutional agency might aid the study of change (Jones & Karsten, 2008). This makes structuration theory ideal for the study of designed and emergent consequences which are essentially changes occasioned by the adoption and or non-adoption of mobile banking services by Kenyan MSMEs. The notion of duality of structure and agency allows knowledgeable, registered mobile banking service users to draw upon internal interpretive schemas, norms and power relations present in their social system during social activities such as deposit, electronic cash transfer, withdrawal, saving etc. and in so doing produce and reproduce the social structure (Giddens, 1984).

Structuration theory argues that social structures do not exist in a concrete sense, but are instantiations of social actions over time intervals (Giddens, 1984). This notion implies that all social activity including mobile banking transactions may be viewed as enabled and constrained by social structures that are continually produced and reproduced via high-level interactions of human and institutional agency through the structures of signification, domination and legitimation (Giddens, 1984). In addition, external entities and internal schemas are only constituted as rules and resources when they are implicated in the recurrent social action in such a way that the "rule" lies essentially in the practice that it guides and animates it at any given time (Orlikowski, 2000). For example, MSMEs' agency is implicated in their capability to issue instructions to the bank to embed new social relations such as

adding and linking new accounts in the mobile banking system in order to enact future inter-account transfers through the cell phone (Schultze & Orlikowski, 2004). The mobile network operator's agency domination is seen in that they are capable of changing tariffs in a way that affects mobile banking transactions, while the agency of regulators is implicated in that they are capable of sanctioning the conduct of mobile network operators (MNOs) and financial institutions. Agency is therefore as Giddens (1984) argues the 'capability to act' but it also involves communication among the actors (signification), exercise of power and control (domination), and enforcement of rules (legitimation).

3.2.1 Assumptions Underlying Structuration Theory

Structuration theory assumes that 'language' is the principle medium of human activities and that through language human beings have the capacity to program their environment and 'not to merely adapt to it' (Giddens, 1976). Structuration theory also holds that 'language' is subject-less and timeless unlike the communication which it enables and constrains and is both temporal and spatial that is, the systems of interactions or activities in which a social structure are implicated in both time and space unlike the structure itself (Giddens, 1984).

Giddens (1976) further argues that "*a structure can be described 'out of time', but its functionality cannot*" (p.120). The theory provides that social structures are only implicated in the activities of knowledgeable agency hence the 'duality of structure' rather than the 'dualism of structure'. Therefore a social structure is not a 'group', a 'collectivity' or an 'organization' even though such entities have structures (Giddens, 1979). A social structure is produced and reproduced by agency activities and once produced the social structure goes on to enable and constrain the very activities of its agency (Giddens, 1984).

A structurational perspective assumes that the modalities of interpretive schemes, facilities and norms mediate between the three distinct virtual structures shown in figure 3.2 namely,

1. **The structure of signification:** produces meaning through organized webs of language that include semantic codes, interpretive schemes and discursive practices, to enable interactive communication which further reinforces signification.

2. **The structure of domination** produces (and is an exercise of) power that originates from the control of resources.
3. **The structure of legitimation** produces a moral order by naturalising actors in societal norms, values and standards which further reinforces morality or sanction.

At the embryonic stage of conceiving his masterpiece, Giddens (1976, p. 127) put forward an analytic argument that, '*all interaction involves communication, the operation of power, and moral relations and that the modalities where these elements of interaction are brought off provide the means whereby the social structures are reconstituted*'.

Additionally, the concept of *regionization* perceives the interactions and relations that determine the continuity of social life as co-present in time and space and as reaching beyond the present time-spatial circumstances to constitute subsequent interactions. The concepts of *time-space routinization* and *time-space distancing* are thus coined to articulate the 'presences' and 'absences' through modes of regionization that channel practices of social life into and out of site or locales (Giddens, 1984; Sahay, 1997). The causal relationships among structuration concepts are diagrammatically illustrated in detail in figure 3.2.

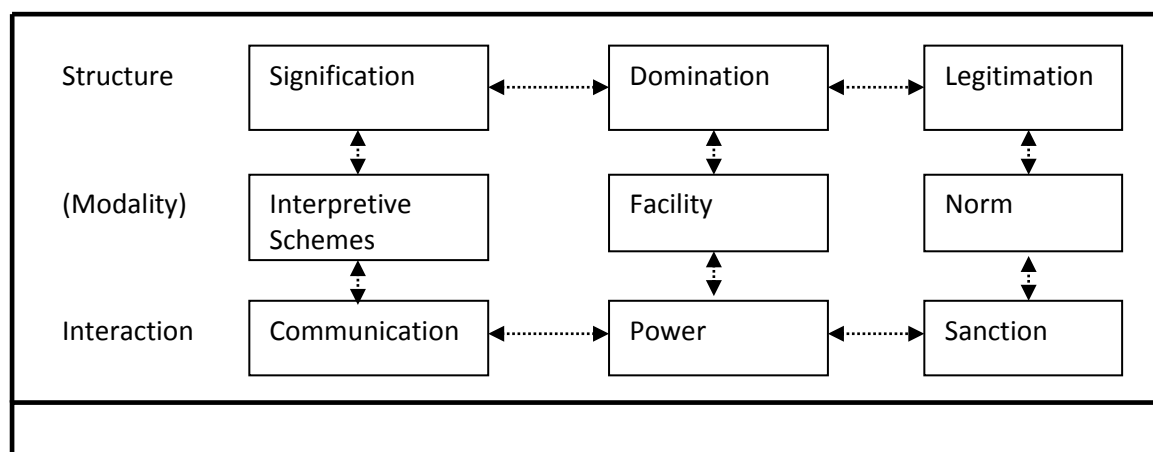


Figure 3.2 Dimensions of the Duality of Structure (Jones & Karsten 2008, p. 130)

From a structuration perspective, a social structure is both the medium and the outcome of the actors' social practices also viewed as constituting the social system under investigation (Giddens, 1984). Giddens's (1984) argument yields the high-level view of a mutually

constitutive duality of structure in figure 3.3. For example, mobile banking interactions represent a social system which is arguably not visible but is instantiated only in the actors' actions or agency such as depositing, withdrawing or transferring of mobile-money. The actors' actions are the instances or particular realizations of the social structure implicated in the mobile banking IT artifact.

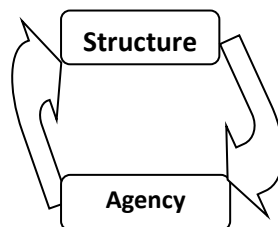


Figure 3.3 Duality of Social Structure: Derived from the writings of Giddens (1984)

Giddens (1984) postulates that ‘human social activities, like some self-producing items in nature are recursive. Through their activities, agents reproduce the conditions that make subsequent activities possible’ giving rise to a duality of structure rather than functional dualism. Giddens (1984) further conjectures that all competent members of society are vastly skilled in the accomplishments of social activities and are therefore expert sociologists whose knowledge patterns are integral to their social life. This form of theoretical understanding in the context of this thesis research helps to make sense of and differentiate the usage activities of mobile banking consumers, the design and deployment activities of application developers, the MNOs’ and banks’ activities in providing mobile banking service etc.

However, the social actors’ knowledgeability is not infinite but is premised on the practical consciousness defined as the actor’s capability to ‘go-on’ in the routines of social life, which falls within the limits of discursive consciousness (what can be explained), and the unconscious motives and cognition (Giddens, 1984). As such, the social actor’s agency and the expected and or designed consequences of ICT usage is severely hampered by the actor’s partial comprehension of the agential context and thus creates room for unintended consequences of intentional and unintentional action (Orlikowski, 1992). Therefore, unintended consequences are occasioned by the bounded knowledgeability of social actors (Giddens, 1984). Structural duality implies that “the moment of production of action is also

one of reproduction of the contexts of the day-to-day enactment of social life” (Giddens, 1984). Therefore a structure which is both medium and outcome of agential action, ‘has no existence independent of the knowledge that agents have about what they do in their day-to-day activity’ (Giddens, 1984). For instance, MSME’s subscription to a mobile network and opening of a bank account are a form of agency that recreates the context in which mobile banking service provision may be undertaken in extended time-space contexts (cf. Giddens, 1984).

Figure 3.3 is therefore a graphical interplay between the three fundamental concepts of *reflexivity, recursiveness and routinization* which Giddens (1984) conceptualises as follows:

- (1) **Reflexivity:** The ability of a social actor to monitor the actions of other actors in its space and act appropriately. Knowledgeable agents use their stratification model to reflexively monitor their interaction with other actors (Giddens, 1984). Therefore the production and reproduction of social life is a ‘skilled accomplishment’ of knowledgeable and capable human subjects (human agency) rather than an autonomic response to established logic or functional imperative’ that underlie the functionalist view (Giddens, 1984). Reflexivity thus makes human social practices to be recursively ordered over time.
- (2) **Recursiveness:** The conditions under which social life takes place are neither fully comprehended nor wholly intended by social actors. There is what is ‘*known*’ and what is ‘*unknown*’ to the human agency about the social context under consideration (Giddens 1984). For the ‘*known*’, human agency can prepare by design or make informed preparation in advance while leaving the ‘*unknown*’ to be shaped by other significant actors. The continuity of reproducing the social life across time and space is always grounded upon the duality of structure which presupposes ‘the reflexive monitoring of agents in and as constituting the *duree*’ of everyday social practices’ (Giddens, 1984). Since human knowledge is always bounded, the flow of human action continually produces consequences which are unintended by the actors, but which further form unacknowledged conditions of action in a feedback loop described as the ‘stratification model’ of the agent upon which the rationale of this thesis research and its nomological

net discussed in chapter one is premised. Mobile banking designers and vendors for instance lack comprehensive knowledge of what the target end-users might do with an IT artifact once it is placed in the usage environment, a reality that is well captured by improvisation theory (Walsham & Sahay, 2006).

- (3) **Routinization:** Structuration theory is further anchored on the proposition that, ‘the continuity of social life depends both on ‘interactions’ between actors who are co-present in time and or space and on ‘relations’ that reach beyond the ‘here and now’ to constitute interactions with others who are absent in time and or space’ (Giddens, 1984).

Routines play a significant role in sustaining social institutions (Jones & Karsten, 2008). For example, routine usage practices of MSMEs and other users of mobile banking system are required to sustain the virtual social structure and the social system that the artifact reifies (Workman, Ford, & Allen, 2008). Further, user-authentication in moments of interaction with mobile banking using passport or national identification numbers may presumably be viewed as predictable routines that perpetuate their agency and that of the social institutions (Jones & Karsten, 2008). Notably mobile banking as a social system enables banks and MNOs to give financial services to MSMEs and other customers who are not co-present using ubiquitous mobile technologies (Orlikowski, 2000). Service delivery is achieved through social and system levels of integration, both of which are “regularised relations of relative autonomy and dependence” established among the social actors in a mobile banking service usage (Boudreau & Robey, 2005; Giddens, 1984). For example, the routines of MSME’s customer and supplier relations depend on the routines of MSME-bank relations, since a customer’s request to be permitted to pay for goods via mobile banking service in future transactions, requires both MSME owner’s or manager’s agreement or acceptance as well as MSME’s written authority instructing the bank to embed their perceived social relations into the mobile banking system as an expert system (Schultze & Orlikowski, 2004). Notably, MSMEs at times decline some clients’ request for permission to settle their bills using mobile banking system, which is a pointer to their knowledgeability as actors drawing upon their practical consciousness (Orlikowski, 2002). The initial social relation may be set up by creating virtual links between the MSME’s and supplier’s accounts or between the MSME’s and customers’

accounts. Such virtual interconnections are then dis-embedded or lifted out from their present time-space context and restructured through MSME's instructions such as 'specific amounts', to enact payment transactions in future or extended time-spaces (Jones & Karsten, 2008). The dual dimensions of '*time-space routinization*' and '*time-space distancing*' inferentially entail the articulation of '*presences*' and '*absences*' through modes of regionalization that channel social life into and out of locales, sites and or domains as depicted in figure 3.4 (Sahay, 1997).

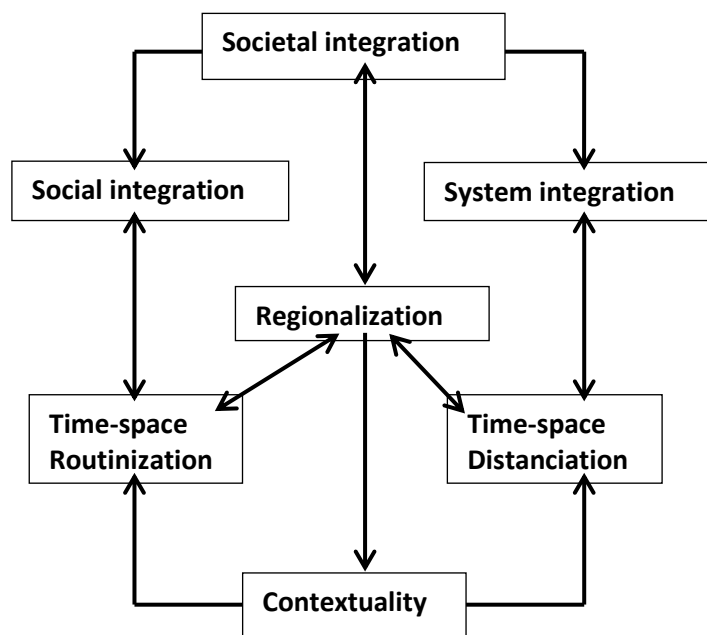


Figure 3.4 Temporal-Spatial Relations among Social Actors: Source (Sahay, 1997)

The three propositions above, Giddens argues, constitute the duality of structure that helps to explain the '*interconnection of routinized and repetitive conduct between actors or groups of actors with long-term, large-scale institutional development*' to a depth that is absent in historical materialism and social theory (Giddens 1979, 1984). Through this lens researchers can make sense of the social context in which mobile banking is deployed by acknowledging:

- 1) That the three main social actors of this research namely MSMEs, policy makers as well as vendors and designers of mobile-banking systems may potentially engage each other in interactions and relations that have both temporal and spatial dimensions. Temporal dimensions imply that they may or may not be performing their respective social practices

at the same time, while spatial dimensions point to the likelihood that they may or may not be present in the same locale.

- 2) That the complexity of the resultant social structure creates opportunity for the social actors or groups of social actors to pursue interests that are at variance with each other. Regulators for instance may pursue a restrictive policy path that leaves no room for rapid technological innovations. Mobile banking application developers may conceive, construct and deploy their system in pursuit of higher profits without first checking with policy makers whether their information system and its deployment infrastructure is covered under the current and existing regulations. This research captures this potentially risky likelihood in what was referred to in chapter one as the *permissive* versus *prohibitive* regulatory frameworks where the permissive framework creates room for rapid innovation as well as a chance for inclusion of non-bank actors such as the mobile money mediating agents.

Besides, the policy makers may also formulate a regulatory regime that gives undue competitive advantage to one mobile banking vendor over its rivals within the structure, albeit inadvertently because of policy makers' partial comprehension of the business environment. This perhaps explicates one empirical observation in Kenya's mobile banking context where MNOs with fewer subscribers have been lobbying the Communication Commission of Kenya (CCK) to review the mobile termination rates (MTR) downwards while firms with more subscribers support either the status quo or an increase in the rates (ITU, 2012).

'*Mobile Termination Rate*' (MTR) refers to the amount of money that a mobile network pays out to a competitor when its subscribers connect to rival's network (Dewenter & Haucap, 2005; Valletti & Houppis, 2005). The rationale behind this rivalry is that subscribers of the smaller networks have higher chances of connecting to the large mobile networks by virtue of its huge subscriber base, making them pay a high value of MTR amounts to the large networks. The larger firms may therefore be said '*to reap from where they have not sown*'. The decision to lower or raise MTRs lies with the Communications Commissions of Kenya (Kenya's state-run telecommunications regulator), and enacting the decision quite often takes time since other government organs and agencies are

involved at least in the lobbying and negotiations phase, and until the decision is externally made, the negatively affected network continues to pay the high mobile termination rate (Valletti & Houpis, 2005; Valletti, 2006). Thus, temporal and spatial dimensions of the actors or groups of actors that constitute the duality of structure as conceived by Giddens in his sociology-oriented structuration theory logically underpins the arguments put forth in this research by enabling us to perceive the relations among the social actors as relations of power that consequently constitute the structures of domination and legitimation respectively (Giddens, 1984).

- 3) That what creates and maintains their structural duality is the existence and continued usage of mobile banking solutions as well as the respective tasks of each actor involved. Therefore a social actor's action may potentially affect the lives and actions of other actors in the social space under focus (Weber & Darbellay, 2010). For instance, simplicity, cheapness and speed that are often seen as likely determinants of adoption of mobile banking may be affected when designers effect incremental changes to their system to enhance security or when mobile banking vendors change the tariffs in pursuit of higher profits.

The degrees and relations of interdependence in any social system are recognized as relations of power (Giddens, 1984). Therefore, a social-cultural context contains hidden agenda, power centres and assumptions that constrain the social actors (Thomas, 1993). Accordingly, critical scholarship demands that researchers subject to scrutiny their common-sense assumptions in order to uncover what is not obvious (Myers, 1999). In the context of structuration theory, agency is conceptualised as the volitional character of human actions where human agents are capable of acting with conscious intention and as knowledgeable agents that closely monitor the domains of social actions within which they operate (Lyytinen & Ngwenyama, 1992). As such, corporeal agents monitor their own actions and their consequences, the actions of others as well as other aspects of the domain of action.

Structuration theory has been employed to investigate the impact of computer supported cooperative work (CSCW) where the authors concluded that there is no omnipotent agent who can foresee all the effects of his or her action, with the implication that human practice is

executed in a partially comprehended context and may be initiated with partially intended outcomes (Lyytinen & Ngwenyama, 1992). And as figure 3.5 indicates, human action often has unintended and indirect effects on the larger social context or institutional system within which the agents are situated (Giddens, 1984).

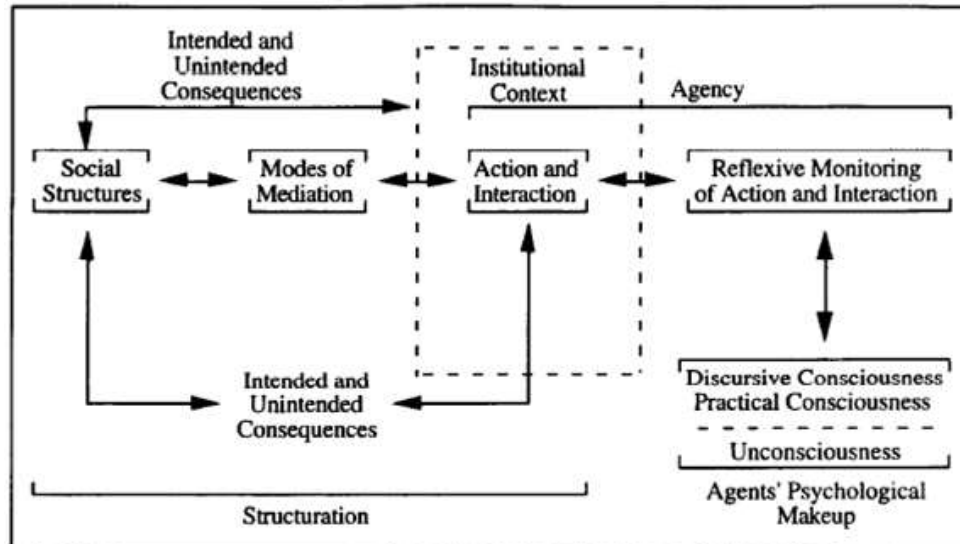


Figure 3.5 Dynamics of Structuration (Lyytinen & Ngwenyama, 1992)

From figure 3.5 an inference may be made that the social actor's partial comprehension of the context of social activity creates grounds for unintended consequences of intentional and unintentional action (Giddens, 1984; Lyytinen & Ngwenyama, 1992). For instance, MSME operators are not always aware what type of customer will turn up at the shop, whether the customer will pay cash or request to pay through mobile banking system.

3.2.2 Implications of Structuration Concepts for Empirical IS Research

According to Jones & Karsten, (2008, p. 143-148), IS research has employed structuration theory in three different ways namely:

- (1) Selective application of structuration concepts where structuration theory is used as repertoire of concepts to be illustrated. This form of usage erroneously portrays the IS field as a net importer of theories that provide insight on the interactions between social actors and the technical-material components of ICTs (Rose et al., 2004).

- (2) Formulation and application of IS-specific versions of structuration theory. For instance ‘duality of technology’ (Orlikowski, 1992) and ‘adaptive structuration theory’ (DeSanctis & Poole, 1994) which illustrate the ability of the IS field to borrow foreign social theories and customize them to illuminate material aspects of the IS phenomena.
- (3) Critically engaging with structuration theory where the IS researcher stretches Giddens’s concepts to a point where they can illuminate IS phenomena hitherto seen as problematic. The original structuration features are retained but adapted to cover the design, deployment and usage aspects of the material ICT artifacts in a way that strengthens the identity and legitimacy of the IS discipline (cf. Benbasat & Zmud, 2003; Jones & Karsten, 2008).

As illustrated in the paragraphs that follow, this thesis adopts the first and third approaches outlined above in using structuration theory as a lens with the hope that the resulting monograph will act as a guide for other IS researchers seeking a comprehensive but critical application of structuration theory in their IS studies. Jones & Karsten (2008) IS studies that employ structuration ideas sympathetically and critically represent an important but under-explored area.

Table 3.1 outlines some key aspects of the structuration theory that significantly affect the design and execution of empirical social science research and identifies their implications for IS research. Contextual implications for the study of mobile banking are also highlighted (cf. Giddens 1984, pp. 281-284).

Table 3.1 Potential Implications of Structuration Concepts for Empirical IS Research: Adapted and modified from Jones & Karsten (2010, p. 135)

	Key Feature	Implication for IS Research	Contextual implications for this study on mobile banking
1	Human beings are knowledgeable agents	Researchers should consider social actors as being highly knowledgeable about what they do (even if they are not always able to express it verbally) and as actively involved in the enactment of social practices (rather than	MSMEs, regulators, and mobile banking designers knowledgeably engage in social practices and social relations in pursuit of some known interest e.g. save time and money, protect consumers, make profits etc.

		being controlled by structural forces of which they are unaware)	
2	Knowledgeability of human agents is always bounded on one hand by the unconscious and on the other by the unacknowledged conditions and unintended consequences of action (Giddens, 1984; Giddens, 1990b)	Social actors' understanding of their practices is necessarily limited, so researchers should consider their accounts as offering only a partial explanation of their actions, which is to be supplemented by other evidence	MSMEs, regulators, and mobile banking designers have partial knowledge of their operating context and may not fully predict the outcome of their social practices (Clark et al., 1990)
3	The study of day-to-day life is integral to the analysis of the reproduction of institutionalized practices	If researchers want to understand large-scale, institutional, social phenomena that persist over time, they need to study the everyday practices of the relevant social actors that constitute them	This study looks at social actors who are involved in the design and deployment, usage and regulation of mobile banking i.e. MSMEs, regulators, IS designers
4	Routine, psychologically linked to the minimizing of unconscious sources of anxiety, is the predominant form of day-to-day social activity	Most everyday social practices that researchers study are routinized (tending to reproduce social structures), and hence stable over time, because this is psychologically reassuring for social actors	Regulators and policy makers need to closely monitor the activities of IS designers and users and based on their observation design regulatory frameworks that are stable over time
5	The study of context, i.e. contextualization of interaction is inherent in the investigation of social practices	To understand how social practices are sustained over time, researchers ought to study the particular setting in which they take place rather than ignoring or seeking to control the setting	The study has elected to use EDTM (ethnographic interviews and participant observations) to explore the emic worldview and social practices of MSMEs in their own settings as they interact with mobile banking (Berry, 1989; Gladwin, 1989a)
6	Social identities, and the position-practice relations associated with them, are 'markers' in the virtual time-space of structure	Although structure is virtual, its effects can be observed indirectly through its influence on the social roles that people play	For instance an analysis of what social actors e.g. MSMEs and vendors can and cannot do points to the existence of virtual social structure in the context under study
7	No unitary meaning can be given to <i>constraint</i> in	A variety of different types of constraint (material, sanction,	Has a bearing on the nature of things that constrain and

	social analysis	and structural) may enable and restrict social actors in a particular setting	enable social practices e.g. MSMEs being able to use mobile banking to do so much, not everything they want
8	Among the properties of social systems, structural properties are particularly important, since they specify overall types of society	Different types of societies are characterized by different structural properties that shape the norms, meanings, and power relations of social practices	MSMEs, regulators, and mobile banking designers are the social actors in the society under focus whose structural properties derive from interpretive schemes used in the application, regulatory documents, resource allocation, power and norms
9	The study of power is an important consideration in social sciences	Accounts of social practices need to give particular attention to the operation of power relationships	Structures of domination and legitimation exist among social actors of this study's context. For instance MSMEs as users of mobile banking have no control over tariffs that are fixed by vendors; designers have to align ICT products with regulatory regimes formulated by policy makers
10	There is no mechanism of social organization or social reproduction identified by social analysts which lay actors cannot also get to know about and actively incorporate into what they do	People can always learn about social researchers' accounts of how society works and may draw on these in their actions	This study, besides its reliance on empirical observations, also critically evaluates other related studies and draws on them to inform the ultimate knowledge claims (Ellis & Levy, 2006)

3.2.3 Structural Model of Technology

The role of active and knowledgeable human agency in the creation and sustenance of the virtual social structure is a key concept of structuration theory (Jones & Karsten, 2008). Orlikowski (1992) postulates that technology is a human artifact created and sustained by human action through maintenance and adaptation of technology. Figure 3.6 shows that the interplay between technology and its usage context creates a duality of virtual structure that is only sustained by the actions of the social actors and that the resulting technology modifies organizational structures (Orlikowski, 1992; Pozzebon & Pinsonneault, 2005).

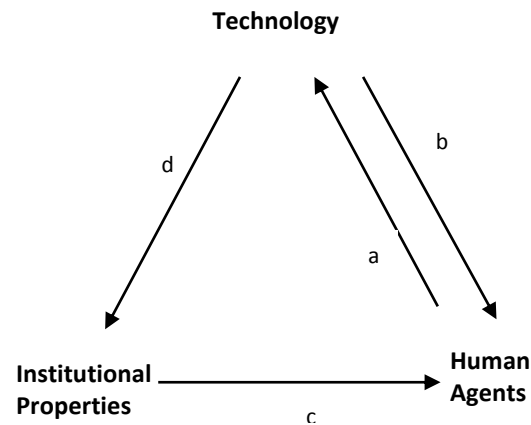


Figure 3.6 Interplay between IT artifact, Human Actors and Organizational Character (Sourced from Orlikowski, 1992)

Orlikowski's (1992) unidirectional perspective is however silent on the influence of institutional properties on the technological artifact. From table 3.2 it may be argued that the functionality of a technology is predetermined at the design stage where developers embed their intended consequences (desired outcomes) using linguistic constructs, menu options, program codes and procedures that best automate the target task (Orlikowski, 1992).

Table 3.2 Deciphering Causal Relationships between Human Action, IT Artifact and Institutional Parameters: Sourced from Orlikowski (1992)

ARROW	TYPE OF INFLUENCE	NATURE OF INFLUENCE
a	Technology as a Product of Human Action	Technology is an outcome of such human action as design, development, appropriation, and modification
b	Technology as a medium of Human Action	Technology facilitates and constrains human action through the provision of interpretive schemes, facilities, and norms
c	Institutional Conditions of Interaction with technology	Institutional properties influence humans in their interaction with technology, for example, intentions, professional norms, state of the art in materials and knowledge, design standards, and available resources (time, money, skills)
d	Institutional Consequences of Interaction with Technology	Interaction with technology influences the institutional properties of an organization, through reinforcing or transforming structures of signification, domination, and legitimation

Given the reflexive character of the structural duality and the recursive nature of the social context in which the technological artifact is embedded as envisaged in the structuration theory, the level of task automation initially envisaged by designers is only partially achieved (Giddens, 1984). Designers of ICTs are knowledgeable and capable agents but they have partial perception of the target context that comprises of human users with partial knowledge of the design context. And as Orlikowski (1992, p. 410) contends the *design mode* has to interact with the *use mode*.

3.3 Mapping the Mobile Banking IT Artifact onto the Structural Model

Figure 3.7 presents a high-level view of the design specification of a mobile banking system showing the complex web of interactions that provide the basis for treating it as a social structure in this thesis (Giddens, 1984). As explained in the preceding paragraphs, Giddens (1984) articulates ‘structure’ as recursively organised sets of rules and resources that exist inside the actors’ as ‘memory traces’ that are only instantiated in the activities of social life such that the structure itself is from a Durkhemian perspective, arguably more internal than external to their activities (Giddens, 1984). The social system in which the structure is implicated is on the other hand perceived as comprising the social practices of situated human actors reproduced across time-spaces (Giddens, 1984). For example, the social structure related to the mobile banking IT artifact would cease to exist or function if banks and MNOs withdraw their ‘allocative as well as authoritative resources’ such as the safe custody of mobile money, bank account, telecommunication network, airtime etc. The proper functioning of mobile banking social system is also contingent upon the regulative and constitutive rules enacted by the regulators and the other actors to provide control, regulation, legal redress, and shared meanings. From Giddens’s perspective, social rules are seen as possessing ‘sanctioning or regulative power’ as well as ‘constitutive aspects or meaning’ (Giddens, 1984). In order to analyse the structuration of a social system an inquirer has to study how the modes in such systems are produced and reproduced, bearing in mind that they are grounded in the knowledgeable practices of the situated actors who draw upon both allocative and authoritative rules as well as resources they mobilise in the action contexts (Giddens, 1979; Giddens, 1984).

The mobile banking social structure is implicated in the agency activities as follows: Telecommunications firms provide the mobile network to propagate the electronic value; mediating money transfer agents across the country provide service access points that enable appropriation of mobile banking services while the mobile bank provides safe custody of the electronic money and manages the customer account relationships.

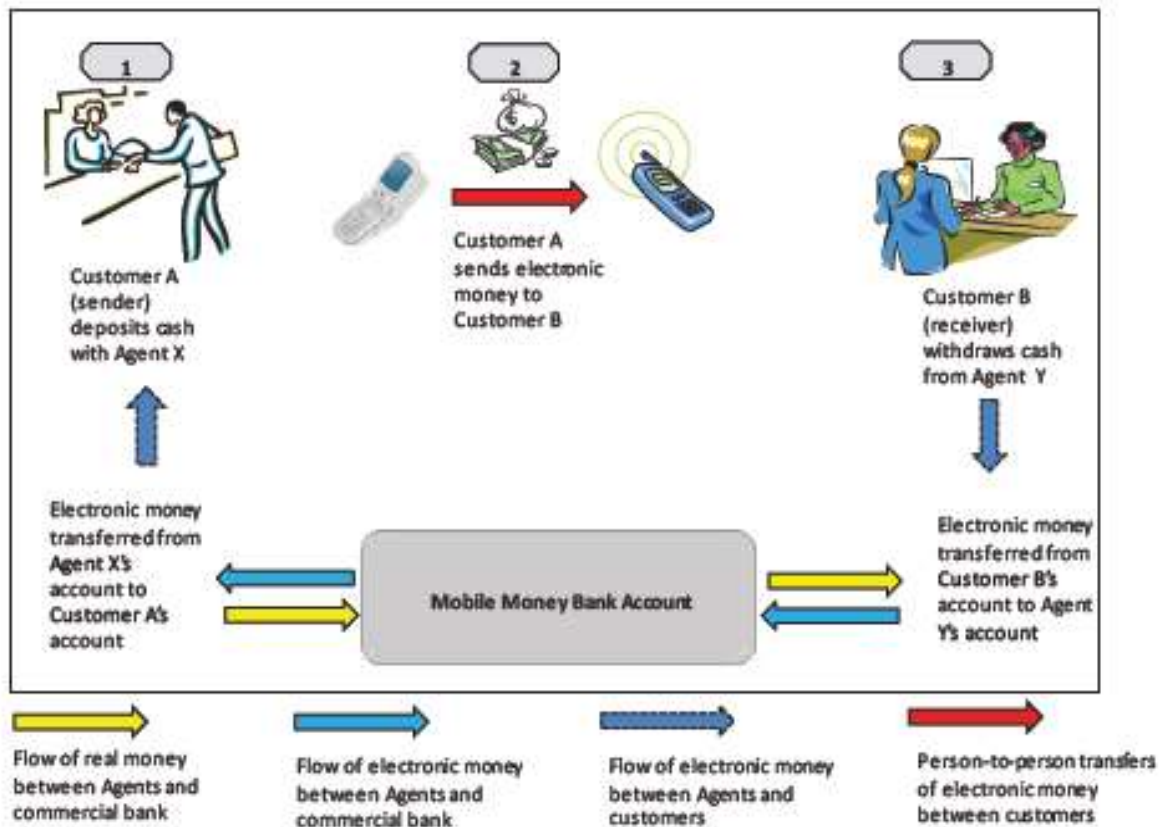


Figure 3.7 Design Specification of Mobile Banking (Kiringai et al. 2010)

The architecture of mobile banking usage creates a complex web of interrelationships among the social actors who include MSMEs, money transfer agents, banks, mobile network operators, banking, monetary and telecommunications regulators. The internal structures that constitute the mental model of the social actor's context are as imperative as the external context within which social practices or human action are enacted and which consequently delimits the range of options open to the actors (Jones & Karsten, 2008; Murray-Prior, 1998). As figure 3.7 shows the material aspects of a mobile banking infrastructure such as cell phones, mobile network, software and hardware components as well as business settings of

money transfer agents constitute the context which constrains and enables business activities of MSMEs, MNOs, banks and regulators of banking and telecommunications sectors in the research context and by so doing instantiates a more abstract social structure in which relations of relative autonomy and dependence are embedded.

3.3.1 Relevance and Applicability of Structuration Theory to the Research Problem

A key aspect of the mobile banking technologies in the Kenyan context is that such innovations preceded regulation, an empirical observation that makes Giddens' theory ideal to investigate the impact or consequences of human intentional action when executed in a partially apprehended legal environment (Lyytinen & Ngwenyama, 1992). The research context was conceptualized as 'a circle within a circle within a circle' that is, 'micro inside meso inside macro' as shown in figure 3.8.

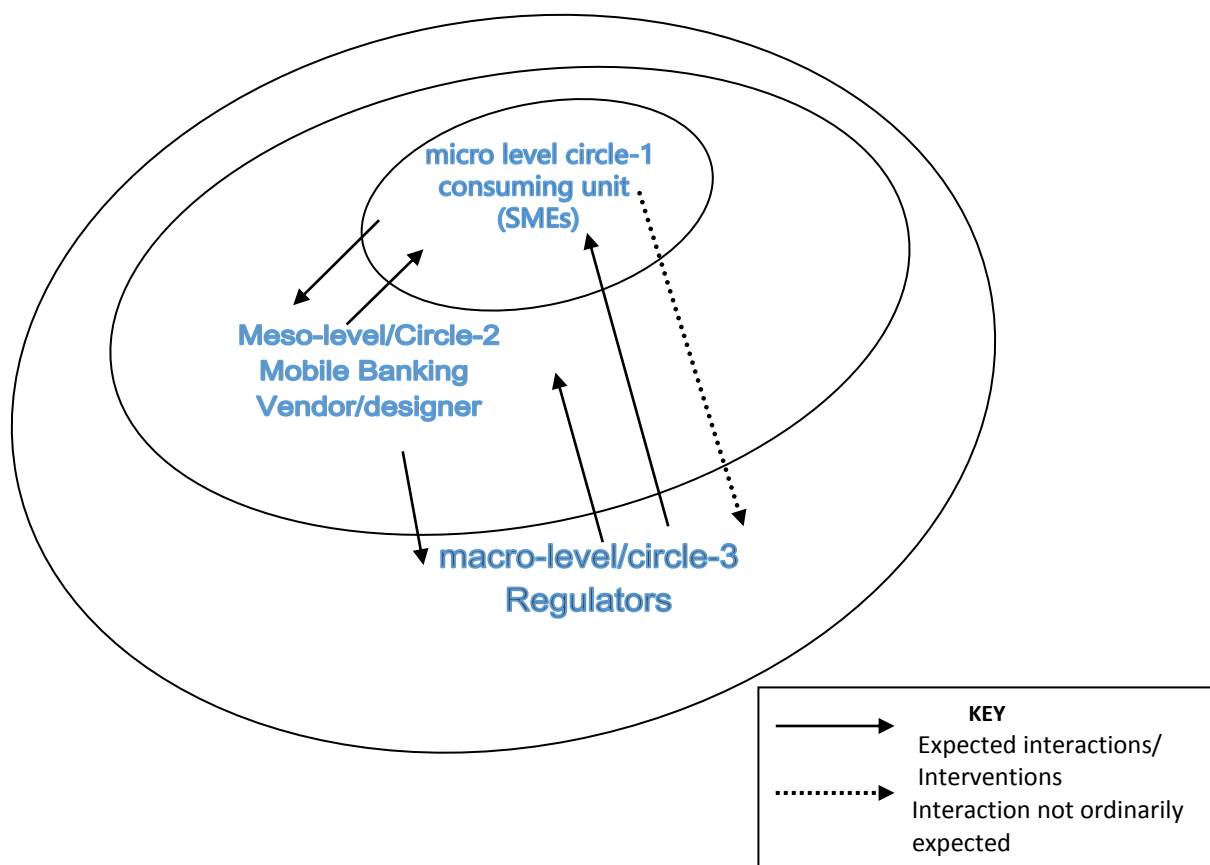


Figure 3.8 Structural Views of the Three Levels of the Study Phenomenon (CCK, 2011)

Figure 3.8 represents the researcher’s own conceptualization of the mobile banking service and regulatory interactions context as outlined in various policy documents available in the Communication Commission of Kenya website. State regulators in Circle 3 formulate regulatory policies and enforce rules that affect both mobile banking technology vendors in circle 2 and consumers in Circle 1. It is conceivable that a disgruntled actor in Circle 2 may also seek legal redress from the regulators in Circle 3 and that minimal interactions are expected between service consumers in Circle 1 and regulators in Circle 3.

3.3.2 Relations and Interactions that Constitute the Social Structure under Focus

The use of structuration theory to investigate the research phenomena helps to uncover the systems of relations and interactions that constitute the social structure under investigation as shown in table 3.3.

Table 3.3 Application of Theoretical Framework

Level of Abstraction	Social actor	Relations and Interactions	Theoretical Lens
Circle_1 (micro-level)	MSMEs Owners and manager	Enduser-MB IT artifact Enduser-Enduser Enduser-vendor	Structuration theory
Circle_2 (meso-level)	Mobile banking Vendors (IS designers)	Vendor-Enduser Vendor-Technology	Structuration theory
Circle_3 (macro-level)	Regulators	Regulator-vendor Regulator-end-user	Structuration theory

3.3.3 MSME Relations and Interactions: A Focus on the Micro-Circle ‘Decision Points’

The MSMEs’ relations and interactions influenced by mobile banking IT artifact include but are not limited to relations and interactions with customers, employees, suppliers, family members and utility providers e.g. water, electricity. These relations/interactions represent the decision points within the social structure.

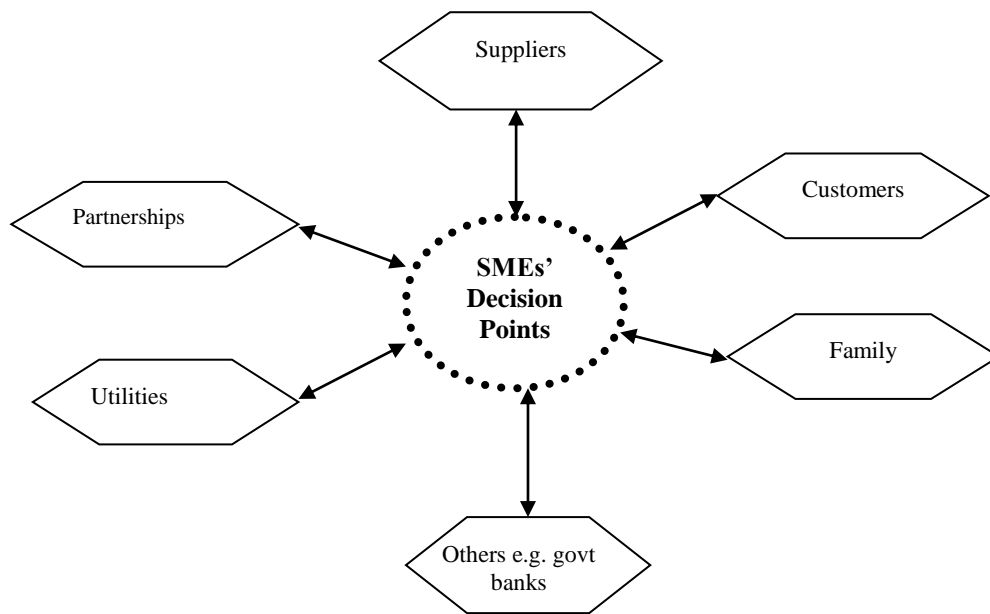


Figure 3.9 Decision Points in the MSMEs' Social Context

Like any other enterprise, figure 3.9 indicates that MSMEs are in business and have internal processes, internal relations as well as external relations (Donner & Escobari, 2010). In addition, this study examines how the owners and managers of Kenyan MSMEs domesticate mobile banking systems in their own businesses. In the context of this thesis, the notion of structuration has been extended to incorporate appropriation, objectification, conversion and feedback constructs (Silverstone & Haddon, 1996). This thesis examines the interactions between MSMEs and mobile banking artifact and the infrastructure it is running on. A detailed empirical and theoretical examination of the relationship between people and ICTs is needed rather than relying on speculative generalizations (Silverstone & Haddon, 1996).

Figure 3.10 presents the key constructs that shape the process of appropriating and making the mobile banking IT artifact part of an MSME's everyday business life.

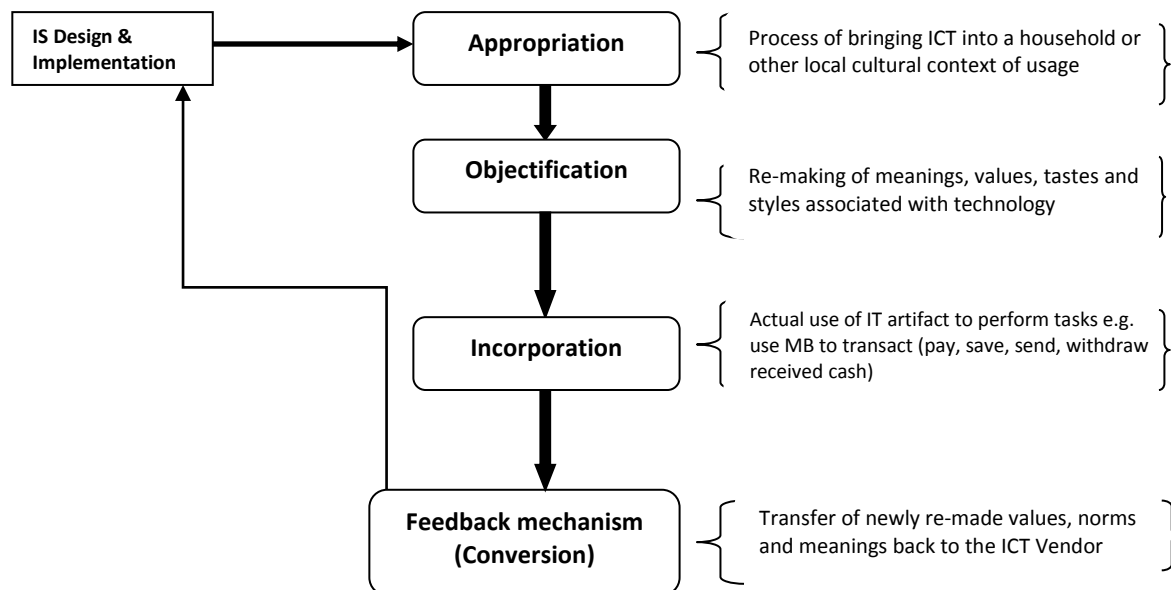


Figure 3.10 Pictorial Representation of ICT Appropriation Process (Richardson, 2009)

As figure 3.10 shows, IS researchers make sense of ICT adoption and non-adoption contexts by using appropriation, objectification, conversion and feedback concepts. These concepts underscore the role of end-users in technological innovations in terms of the work they do in order to make a technological artifact function and make sense in their own social contexts (Donner & Tellez, 2008; Richardson, 2009). Thus it is informative to investigate from a structuration perspective, how social structures are produced and reproduced by agents' adoption activities and how the structures created in turn constrain the processes of adoption and usage of mobile-banking by MSMEs.

3.3.4 Agent, Agency, Action, Intentionality and Consequences

According to Giddens (1984, p. 10), "agency refers to doing". The 'action' on the other hand may be 'intentional' or rationalized if some prior knowledge is used to predetermine the outcome, in which case the intentionality of consequences of actions is therefore perceived as being dependent upon the knowledgeability of the agents and on the power they are able to mobilize (Giddens, 1984). For example MNOs may intentionally shut down the mobile network for purposes of upgrading it from 2G to 3G, but their action may lead to the unintended loss of business for an MSME whose mobile payment customers may not wait

until the network is fully upgraded (Merton, 1936). Structuration theory provides us with the concept of 'stratification model of the acting self' in which 'reflexive monitoring', 'rationalization (intentionality and or competence)' and 'motivation of action' are treated as embedded sets of social processes (Giddens, 1984, p. 3). That is, the interacting agents continuously and reflexively monitor the flow of all actors' activities and the environmental variables of their operating context (Giddens, 1984). This implies that one actor's activities become part of the knowledge that shapes the action of another agent, a notion that makes it necessary to maintain a theoretical understanding of the grounds of their activity. For example, in this study's research context the MSME owner or manager reflexively and routinely monitors the flow of transactional relationship and behaviour of a customer and the social and physical aspects of the business setting. As such, a regular customer who consistently meets his or her transactional and financial obligations may get certain concessions. In a sell or buy encounter, in order for the MSME owner to make a decision whether or not to allow a customer to pay for stock using mobile banking, he or she reflexively monitors the prevailing time-space context or current setting of the transaction at hand (Sahay, 1997). During peak hours of the business when there are many customers waiting to be served, an operator who runs his or her business alone may not readily permit a customer to use mobile banking service. Accordingly, the aspects of time and temporality as conceptualised by Giddens (1984) might be seen as shaping MSMEs' usage of mobile banking application (Jones & Karsten, 2008). Rationalization of human action constitutes the agent's intentionality (Giddens, 1984; Walsham & Chun-Kwong, 1991). For instance, the MSME owner is assumed to rationalize the use of mobile banking when she or he allows one and not the other customer to use the service in a transaction. The perceived competence on the part of the MSME operator derives as Giddens (1984) postulates, from an on-going theoretical understanding of the transaction which is routinely maintained in order to avoid, say, loss through fraudulent mobile banking transactions.

The impact of mobile banking usage by MSMEs is investigated from the perspective of ICT4D that is contrasted with point implementations of ICTs used within organizations (Walsham & Sahay, 2006; Walsham et al., 2007). The rationale behind the development-oriented analytical approach is that a mobile-banking application which is the IT artifact

under investigation, is ordinarily used by MSMEs and other consumers outside of the provider organizations such as mobile networks and or financial institutions, with the implication that the gains in usage-related productivity are determined by a web of complex interactions much as they are determined by the characteristics of the consumer and the characteristics of the innovation itself (Agarwal & Prasad, 1997; Venkatesh et al., 2003). MSME owners and or managers are treated as social actors who possess ‘stocks of knowledge’ or ‘mutual knowledge’ about the workings of their business context and who rely on three categories of knowledge to succeed in their business encounters with suppliers of stock, customers, banks and mobile network operators (MNOs) when using a mobile banking IT artifact. The three categories of knowledge used by the social actors under focus include,

1) Discursive consciousness: includes “what can be said”, for example the describable awareness of MSME operators about the conditions of the business action under consideration such as deposit, withdrawal, sale or payment transactions (cf. Giddens, 1984, p. 76).

2) Practical consciousness: includes knowledge, indescribable or otherwise that underpins the capability of MSME operator to go on in the unfolding scenes of social life in the business setting, that is “what is characteristically done” (cf. Giddens, 1979, p. 5). For instance, the knowledge used to evaluate a request by a customer to use mobile banking system to settle a bill or other means among the many payment options available, cash, direct bank deposit, mobile banking, banker’s cheque, Real Time Gross Settlement (RTGS) etc. According to Giddens (1984), there is a thin line between the practical and discursive forms of the social actors’ mutual knowledge which is both ‘fluctuating and permeable’ rather than rigid.

3) Unconscious sources of cognition and motives: includes forms of cognition that emerge in distorted form or are totally absent in the actor’s consciousness (Cohen, 1990; Giddens, 1979; Giddens, 1984).

In structuration theory, ‘agency’ implies ‘power and choice’ rather than the agent’s envisaged intentions that is, the social actor’s capability to act (Giddens, 1984). For instance, in the Kenyan context, when mobile network operators (MNOs) lower or increase the cost of

airtime and other cell phone service tariffs, they exert power that enables or constrains mobile banking service accessibility and affordability, thus reifying the structure of domination. Kenyan MNOs negotiate for commissions and fee chargeable when banks use their mobile networks to deploy mobile banking and raise tariffs without making reference to end-users, thus rendering them the unrepresented victims of distant relations between banks and telecommunications firms. Structures of domination are further reified by the capabilities and social practices of banks and MNOs when they set tariffs, register money transfer agents, modify underlying ICTs, make organizational policies, rules and regulations that are skewed in favour of service providers (Haas et al., 2010; Weber & Darbellay, 2010). In particular MNOs and banks set limits on the amount of mobile-money that can be exchanged per transaction and at times allow the money transfer agents to have a maximum ‘float’ limit per day that is inadequate to meet the daily transactional needs of MSMEs. Consider a scenario where an MSME operator withdraws money using mobile banking service from the bank account and transfers it to his or her mobile-money account, but cannot withdraw it because the agent lacks enough hard cash (Haas et al., 2010; Weber & Darbellay, 2010). Mobile banking service usability is therefore constrained by its dependence on the efficiency of money transfer agents who are not answerable to banks but to MNOs. The foregoing is a critical empirical observation in that banks and MNOs fall under different regulators in Kenya (Haas et al., 2010).

MSMEs, MNOs, banks, telecommunications and banking regulators are knowledgeable agents since *‘to be an agent is to have the ability both to deploy a range of causal powers in the flow of social practices and to influence the powers deployed by other actors’* (Giddens, 1984, p. 14). For instance, as a regulating actor, Communications Commission of Kenya (CCK) has the legal capability and mandate to intervene in case of disputes among telecommunications firms emanating from say the mobile termination rates (MTR), tariffs, licencing of frequencies etc., through policy aimed at creating a fair playing field for the actors (Dewenter & Haucap, 2005; Valletti & Houppis, 2005; Valletti, 2006). Although lack or inadequacy of cash or mobile money ‘float’ with a money transfer agent is unintended it nonetheless may have a negative impact on MSMEs’ business transactions, lending credence to Giddens (1984) who dispels the notion that human agency is necessarily intentional.

‘Intentional action’ is perceived as “*characterizing an act which its perpetrator knows or believes will have a particular quality or outcome and where such knowledge is utilized by the author of the act to achieve this quality or outcome*”, an articulation which distinguishes between ‘what is done’ from ‘what is intended’ (Giddens 1984, p. 10-11). This notion of intentional action is the premise upon which consequences of social actor’s intentional and unintentional action are understood as the ‘events which would have been avoided had the actor acted differently, but which are beyond the scope of the agent’s power to have brought about (Giddens, 1984). In the Kenyan context, the roll out of mobile-banking innovations with the aim of ‘banking the unbanked’ is an intentional action, while potential crime mutations are unintended outcomes which policy makers ought to know about when designing vendor-consumer protection frameworks. Accepting the foregoing argument confirms the critical role ‘unintended consequences’ might play in the sociological enterprise (Merton, 1936). According to Giddens (1984), repetitive activities located in one context of time and space have regularised consequences unintended by those who engage in those activities in distant time-space contexts. The events of second set of contexts directly or indirectly influence the ensuing conditions for further action in the original context.

Further, unintended consequences of purposive action may be said to be intentional if they are deeply embedded in time and space with the institutional or social practices that trigger them (Merton, 1936). Such unintended outcomes of intentional action represent what Giddens (1984) calls the ‘accordion effect of intentional action’. For example, the rise in crime involving gang attacks on money transfer agents in urban centres, six years after the first mobile payment system was deployed in Kenya to help MSMEs repay their small loans to a microfinance institution is an unintended consequence of a purposive action by mobile network operators. The deployment of a mobile banking system which is the trigger event and the observed outcomes such as the stiff competition between banks and MNOs are not co-present in time-space (Sahay, 1997).

3.3.5 Research contexts for investigating unintended consequences

Structuration theory outlines three main research contexts, in which the role of unintended consequences may be analysed:

- 1) A research context where the researcher seeks to conduct a counterfactual analysis of a sequence of events triggered by a specific event by asking the question: What is the role of the initiating circumstance, or what would have happened to the cumulation of the ensuing events had the trigger event not occurred (Giddens, 1984; Giddens, 1990b; Gregor, 2006). In the context of this study, MSMEs' usage of mobile banking is perceived as the trigger event or the initiating circumstance which may potentially lead to the accumulation of events or outcomes such as crime and insecurity, theft and loss of MSMEs' business cash through fraud, financial service price wars, undue competition between financial institutions and telecommunication firms, financial inclusion, perceived service accessibility, low cost, more time to run the business (Bhattacharyya & Sivanand, 2011; Clarke III, 2008; Morawczynski & Miscione, 2008).
- 2) A research context in which a definite 'end result' is taken as the research phenomenon to explain and show that it is the 'unintended consequence deriving from a sum of courses of intentional action' (Giddens, 1984, p.13). Critical realists refer to this approach as the 'retroduction' and endeavour to unearth the generative mechanisms that underlie an observed outcome (Archer et al., 1998).
- 3) A research context in which inquirers seek to analyse the mechanisms of social reproduction (Giddens, 1984). In such investigations, unintended consequences of actions such as mobile banking usage form the unacknowledged conditions of further action in a non-reflexive feedback cycle called the 'causal loop' (Giddens, 1976). The focus here is to find out how cycles of unintended consequences of intentional acts feed back into the future social reproduction or social practices across extended time periods. This stance derives from the structuration theory in which repetitive activities located in one time-space context are deemed to have regularised outcomes unintended by performers of those activities in distant time-space contexts, such that the events of the second time-space context directly or indirectly influences the conditions of action in the original context (Giddens, 1984; Sahay, 1997). For instance, an MSME's repetitive use of mobile banking applications to transact with distant suppliers and customers may potentially build a social network of trust and foster growth in the customer base, loyalty and retention, and supplier confidence that guarantees a steady supply of stocks even on credit (Morawczynski & Miscione, 2008). Since neither the

MSME operator, nor the suppliers or customers need to travel physically to settle trade bills, it leaves actors with more time to engage in their co-business.

ICTs are context-specific and therefore possess a temporal and spatial dimensions such that, to use the words of Orlikowski & Iacono (2001, p. 131), “*there is no one-size-fits-all conceptualisations of technology that will work for all studies*”. As such, it is incumbent upon researchers to develop a customised theoretical apparatus to suit their specific study in light of the research questions, their primary focus, research methodology and units of analysis (Whetten, 1989; Gregor, 2006).

By adopting the ensemble view of technology, this study treats mobile banking as a social structure that constitutes a web of complex interrelationships created when MSMEs interact with various entities through mobile banking application (Orlikowski & Iacono, 2001). Structuration theory is therefore used as a theoretical lens to view the social structures and social relations existing in the research context in order to understand how Kenyan MSMEs perceive mobile banking technology and its hosting infrastructure when they adopt, domesticate and interact with it (Giddens, 1984; Hynes & Richardson, 2009). This study follows Giddens (1984) and Stones (2005) who acknowledge the existence of both ‘virtual internal’ and ‘objective external’ structures and also view the former as mediating the social action. The objective external structures constitute the *real* material context that delimits the range of options open to the social actors (Jones & Karsten, 2008). Accordingly, mobile banking reifies a social structure or an abstraction that is created by and which restricts the social practices of the social and institutional actors involved that is, MSMEs, MNOs, regulators, customers, suppliers and other entities that interact with MSMEs through the artifact. Such a stance deviates from Orlikowski’s (1992) strict ‘duality of technology’ in which the author views the IT artifact as embodying the social structures, and also from the adaptive structuration theory where the authors’ endeavour to add an empirical angle to the theory of structuration (DeSanctis & Poole, 1994). This study retains but critically engages with the original Giddens’s (1984) notion of structure while treating the IS usage practices as part of the human agency that instantiates the envisaged social structure in an arrangement where materiality of IT artifact as well as the ‘power, knowledge, and interests’ of the agents

play a role in the IS functionality (Jones & Karsten, 2008). The “practice lens” account distinguishes between ‘technological artifact’ from the ‘technology in practice’ and contends that the former may embody real material properties but not social structures and relations because such are presumably implicated in the usage practices of human agents during interactions with the IT artifact (Orlikowski, 2000, p. 407). A ‘structure’ as conceptualised by Giddens ‘cannot be inscribed in technology because doing so would give it an existence separate from the social practices of the actors’. And as Jones & Karsten (2008, p. 132) further postulate, ‘a structure that is embodied in a real material artifact differs from the one that is implicated in the activities and practices of knowledgeable agents’. Therefore separating the social structure from the social practices of the situated actors may arguably be seen as a form of denunciation of its very existence (Archer et al., 1998).

Mobile technologies have also been described too young and thus lacking stable theories to support qualitative research (Duncombe & Boateng, 2009). Some ICT4D researchers have subsequently contended that such research should be carried out without having to employ theoretical frameworks (Donner & Tellez, 2008). This study takes issue with the atheoretical research approaches and adopts an ensemble view of technology as conceptualised by Orlikowski & Iacono (2001) thus making structuration theory an effective lens to theorize the research context in its effort to investigate and elucidate the designed and emergent consequences of the MSMEs’ usage of mobile banking (Giddens, 1984; Porpora, 1989). While pointing out that the everyday social life occurs as a *duree* that is, a continuous flow of intentional action, Giddens (1984) argues that the acts of a social actor have unintended outcomes that create unacknowledged conditions of further acts. Therefore the acts that constitute the design, deployment, usage and regulation of mobile banking usage transactions create a decision making context for further agency.

Structurational IS research has not paid adequate attention to the ‘on-going mutual constitution of structure and agency’, a notion central to structuration theory (Rose, 1998). Therefore Jones & Karsten (2008) call for greater sensitivity to the roles of social actors in creating, altering and sustaining both mutable and immutable contexts. Accordingly the ‘intrinsic interconnection between social actors and social institutions’ suggest the need for IS

researchers to focus on the individuals' contribution to organizational and social power relationships, norms, and meanings, and also on how individual practices are shaped by the context (Bachrach & Baratz, 1962; Giddens, 1984). This thesis research sheds further light on how the interlinked social acts of human and institutional agents including MSME owners and managers, banks, MNOs etc. create power relations that reproduce the mobile banking usage context. A conceptualization of technology as a social structure "enmeshed in the conditions of its use", when grounded in the Giddens's (1984) structuration theory provides a feasible theoretical sense-making lens to unearth the designed and emergent consequences of using a particular ICT initiative, and also to view the outcomes yielded when users appropriate the social structures objectified in an ICT artifact (Orlikowski, 2000).

The actors' social practices such as the MSME's use of mobile banking system to pay a supplier or receive payments from customers, to deposit daily business proceeds into the bank account, to withdraw & transfer funds from MSME's bank account to MSME's mobile-money account, or to effect inter-account and or intra-bank funds transfer constitute 'systemness on the level of relations' between MSMEs and their customers and suppliers, banks, MNOs and mobile-money agents as the participating social systems or collectivities.

Mobile banking systems interconnect several relatively 'autonomous and dependent' social relations such as MSME-bank, MSME-MNO, MSME-MMTA, MSME-client/supplier, and Bank-MNO interactions. Thus, a mobile banking IT artifact mediates financial transactions in a way that permits future enactment of the exchanges or intimacies of co-presence and is therefore arguably seen as facilitating "social integration without co-presence" and as sustaining "system integration" through the routinized actions of knowledgeable human and institutional agents (Jones & Karsten, 2008, p. 133). And as Verbeek (2005, p. 130) asserts, humans and the relations they have with their world are shaped by "artifactual mediation".

While setting the grounds for structuration theory, Giddens (1984, p. 25) defines a 'social system' as the 'situated activities of human agents reproduced across time and space'. The structure is further defined as a set of "rules and resources organised as structural properties of social systems", elsewhere conceived as 'stocks of mutual knowledge' that enable a social

actor to ‘go on’ in the routines of everyday life (Giddens, 1984). Two types of rules are then articulated:

- 1) The ‘rules of social life’ perceived as techniques or generalizable procedures used by actors to enact and or reproduce social practices, exemplified in the research context by the fact that different users of mobile banking always follow the same procedure of initial user-authentication in order to gain legitimate access to the service, and
- 2) The ‘formulated rules’ defined as ‘codified interpretations of rules’, herein represented by usage of mobile banking service menu options on the cell phone.

While seemingly taking great exception from the articulation of ‘power as a property of society’ in (Parsons, 1963) and (Foucault, 1972; Foucault, 1980), Giddens (1984, p. 15) follows (Bachrach & Baratz, 1962) and acknowledges the two faces of power namely ‘the capability of social actors to enact decisions’ and ‘the mobilization of bias’ that is built into institutions’. The British sociologist however, quickly warns against a dualistic view of power and asserts that a ‘structural duality’ in which rules and resources are perceived as ‘structured properties of social systems’ drawn upon and reproduced by practically conscious and situated social actors during interactions, is a better approach to understand the notion of power (Bachrach & Baratz, 1962; Giddens, 1979). For example, service incentives such as low charge call times, customizing IT artifacts, setting ‘float’ limits and tariffs, distributing service advertising materials, and registering mobile-money agents, are resources that form the media through which banks and telecommunication firms exercise dominating power over the users of their mobile banking systems and other actors in the social system under focus while maintaining ‘relations of autonomy and inter-dependence’ among all players.

Accordingly, the social structure associated with mobile banking is herein conceptualised as ‘a virtual order’ of transformative relations that exists as time-space presences, only in its instantiations in reproduced social practices and as ‘memory traces’ of knowledgeable human agents. Giddens’s (1984, p. 33) notion of Structuration articulates two categories of ‘resources’ namely:

- (1) Allocative resources – perceived as transformative capacity to generate command over objects, goods or material phenomena, like the one possessed by banks and MNOs as highlighted in the previous paragraph.

- (2) Authoritative resources which are perceived as the transformative capacity to generate command over human and other social actors. Regulators of the telecommunications as well as financial and banking sectors are perceived as wielding such a power to dominate other actors within mobile banking system (Bachrach & Baratz, 1962).

In the mobile banking application, structures of signification are objectified by the menu options and the language used by the designers. Users have to use the ‘stocks of knowledge’ that underlie their practical consciousness to interpret those menu options and enact a mobile-banking transaction (Cheah et al., 2011). The dimension of signification in mobile banking’s envisaged social structure is critical in that a dissonance between the interpretive schemes of the target system users and those of the designers and vendors might potentially blur or break communication and render the service unusable (cf. Giddens, 1984). In addition, structures of legitimation are reified by the legal usage of mobile banking service which requires end-user authentication with passport or national identification number and without which legitimate access is denied. It should be pointed out that while self-identification information is provided at the time of registration which also takes place at a particular branch of the MSME’s bank, such information on self-identity is dis-embedded from the initial time-space context of registration and used to authenticate the user and enact future mobile banking transactions, in a clear case of time-space distancing in the research context. Thus mobile banking is arguably articulated as a social system in which multiple inter-dependent relations shape the self-identities, risk perspectives and reflexivity of human social actors and institutional institutions (Schultze & Orlikowski, 2004).

Further, structuration theory is premised on the notion of ‘action’ as a continuous flow of social practices where a social actor reflexively monitors his or her own activities and those of others (Giddens, 1984). For instance the MSME owners and managers reflexively monitor the conduct of customers, suppliers, banks, MNOs and MMTAs to enact a business transaction. Banks as mobile phone financial service providers may reflexively monitor the frequency with which their registered customers use the mobile banking service to design marketing strategies and or alter the service commission and usage fee payable to MNOs,

besides monitoring the growth of the service user base. MNOs on the other hand reflexively monitor the frequency of loading airtime by its network subscribers to determine new tariffs, and also track the network traffic for purposes of system scalability. The foregoing forms of agency and action in the study's context constitute 'reciprocity of social practices of autonomy and dependence' among the stakeholders that reflect system integration across extended time-space contexts (Giddens, 1984).

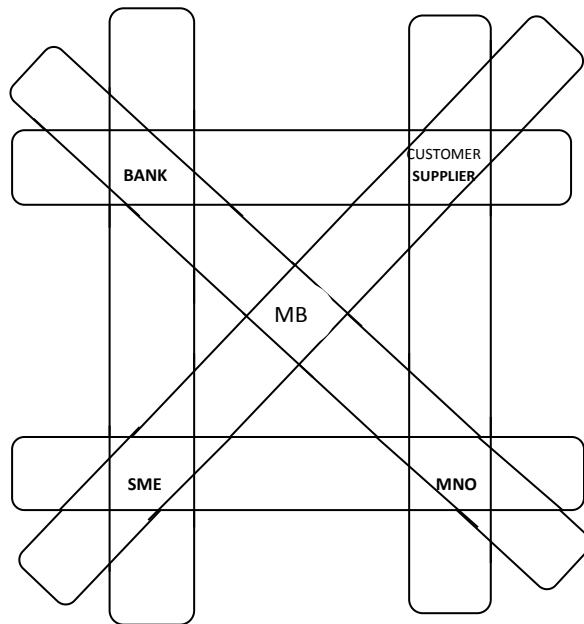


Figure 3.11 Autonomous and Interdependent Relations of Mobile Banking Social Actors

Figure 3.11 shows that a commercial bank provides conventional banking services to social and institutional actors in a manner that challenges the separation of technology, work and organization (Orlikowski & Scott, 2008). Mobile network operators (MNOs) provide the infrastructure such as the global system for mobile communication (GSM) network on which banks deploy mobile banking services. As an example of service convergence, mobile banking can potentially benefit all the involved parties (Kim et al., 2009). However that mutual benefit is contingent upon factors which reinforce mutual trust including 'institutional offering (structural assurances), perceived benefits (cognition), personality (personal propensity) as well as firm characteristics (firm reputation)' (Molony, 2007). For MSMEs and their customers and suppliers to access mobile banking services, they must be subscribers of the MNOs. Thus the autonomous mobile banking relations and social practices between MSME and the bank are also dependent upon the cell phone usage relations and social

practices between the MSME and the MNO. System integration or ‘Systemness’ on the level of relations between social systems or collectivities in this study’s research context is critical, because when the GSM network malfunctions, it affects accessibility of mobile banking services. Apart from highlighting the social and system integration created by the reciprocity of social practices between the actors, figure 3.11 also sheds more light on the dialectic of control in which MSMEs as consumers of mobile banking play a vital role that sustains the institutional practices of the major collectivities such as banks and MNOs in the social system.

3.4 Theoretical Elaborations Relating to Ethnographic Decision Tree Modeling

This section explores the theoretical perspectives of EDTM and offers a detailed account of the theory of real-life choice which underpins EDTM methodology.

3.4.1 Elimination-By-Aspects: Tversky’s Theory of Choice

While building on the notions of the theory of consumer choice advanced by Lancaster (1966), Tversky (1972) developed the theory of elimination-by-aspects which partially underpins the construction of the ethnographic decision tree models. Descriptively speaking, elimination-by-aspects is a theory of choice underpinned by what Murray-Prior (1998) refers to as a ‘covert’ but rapid elimination process that regards each decision alternative as a set of aspects which a decision maker unconsciously evaluates in a staged process until a finite set of two or three alternatives are left (Tversky, 1972; Tversky & Kahneman, 1981). As explained further down, the remaining alternatives are then ordered using one of the aspects or what Gladwin (1976) calls the ‘ordering aspect’. In real-life, it is argued elsewhere, a decision maker will most likely select the ordering or constraining aspect either through subjective choice of the most preferred aspect without ranking the remaining ones (Tversky, 1972). On the other hand, constraints may also be imposed from the outside or selected through the use of ‘decision rules’ derived from the decision maker’s mental image or self-schema of the context; a notion described elsewhere as the use of ‘rules behind rules’ or ‘reasons behind reasons’ (Murray-Prior, 1998). Gladwin conceptualizes decision criteria as part of the decision maker’s mental model of the decision context (Gladwin, 1983).

Whereas the two-stage hierarchical decision models constructed using EDTM as envisaged by Gladwin (1989) have the potential to describe and predict an individual's decision process, the debate on how to identify the aspects and or decision constraints persists in literature among both decision and behavioral theorists (Murray-Prior, 1998; Murtaugh & Gladwin, 1980). Good exemplars of this pre- and post EDTM debate are provided by Kelly's (1955) theory of personal constructs and Tversky & Sattath (1979, p. 542) where human behaviour is viewed as 'inconsistent, hierarchical and context-dependent'. In particular, Murray-Prior (1998) follows Kelly's (1955) theory of motivation, learning and behaviour, and conceptualizes *aspects* as sets of constructs that people, while acting like scientists unconsciously choose from initially fairly rapidly and later less quickly in order to increase their chance and capacity to predict and control their social world around them. As such the personal constructs theory is seemingly consistent with EDTM's stages of pre-attentive and conscious elimination of alternatives by aspects (Murray-Prior, 1998).

A decision maker in a natural setting derives the worth or utility from the aspects of goods and services (Lancaster, 1966; Tversky, 1972). Real-life decision makers, employ a psychological mechanism to choose and rank-order their preferred aspects (Kahneman & Tversky, 1982; Kahneman, 2003). Personal construct theorists analogously liken people with scientists, in that they 'develop hypotheses or constructs based on their existing belief structure, or on the patterns of evidence they see as viewed through the lens of their belief structure, and their perception of the social context around them' (Kelly, 1955). Unlike the utility theories, personal construct theory is not a mathematical model of human behaviour but it is premised on a basic set of corollaries that are contextually shaped (Bannister & Fransella, 1971). The equivalence of this notion of 'people acting as scientists' is where in ethnographic decision tree modeling, Gladwin (1989, p. 9) refers to decision makers in natural settings as experts on how they make the decisions they make.

Perhaps the strongest thoughts on possible sources of decision criteria come from Kelly (1955) who sees human processes as being ordered by how they expect events to turn out with the implication that people's thoughts, motivations and behaviors are determined by the future they look forward to and the way the current behaviour is expected to relate with the

events then (Murray-Prior, 1998). Bannister & Fransella (1971) advances the following corollaries in line with Kelly's (1955) personal constructs theoretical stance on human motivation, learning and behaviour:

- (1) *Construction corollary* that is 'a person anticipates events by constructing their replication'. This implies that the construction and interpretation of future events as well as past experience both inform and shape human behaviour in the current context (Gladwin, 1989c). This corollary seemingly lends support to EDTM's construction of a descriptive model based on past decision criteria, but one that is assumed to possess predictive potential (Bannister & Fransella, 1971, p. 20).
- (2) *Individuality corollary*, that is, people differ from each other in their construction, owing to the fact that they possess different abilities and experiences that subsequently yield their differing construct systems (Whitehead, 2004). EDTM employs this corollary by advocating for individualized ethnographic interviews on the assumption that different informants may base their ultimate decisions on diverse decision criteria to be unearthed ethnographically (Bannister & Fransella, 1971, p. 22).
- (3) *Organization corollary*, that is, each person characteristically evolves for his or her convenience in anticipating events, a customized construction system that embraces ordinal relationship between constructs (Bannister & Fransella, 1971, p. 22). EDTM employs an interpretive anthropological approach that seeks to see the research context and the phenomena under investigation through the eyes of the informant(s) (Bailey & Ngwenyama, 2013).
- (4) *Dichotomy corollary*, that is, a person's construction system is composed of a finite series of dichotomous constructs, where the complexity of certain constructs incorporates others while still others remain unrelated. This creates the notion of singularity in choice that is, choosing one alternative ultimately (Gladwin, 1989a; Murray-Prior, 1998). For example an MSME owner/manager will either adopt or not adopt an ICT product and for good personal reasons (Bannister & Fransella, 1971, p. 25).
- (5) *Choice corollary*, that is, when faced with a choice, a person will choose the alternative that they hope will empower them to make sense of their social world and cope with

emerging complexities (Bannister & Fransella, 1971, p. 29). Therefore Murray-Prior (1998) posits,

“From the viewpoint of a personal construct theorist, people construe the replication of events (construction corollary) using a hierarchical system (organization corollary) of bipolar constructs (dichotomy corollary). Such a view is consistent with the hierarchical decision model where aspects are bipolar in nature and arranged in a hierarchical system” (p. 546).

A choice is made when alternatives are compared and contrasted across a construction system of bipolar and or dichotomous constructs, which EDTM conceptualizes as the aspects and or choice constraints (Gladwin, 1979; Tversky, 1972). In light of the choice corollary cited above, argues this thesis, ethnographic interviews are appropriate since, the way a person perceives his or her experiences is likely to influence their choice of aspects hence the need to learn the emic categories and meanings from the cultural insiders’ perspective (Morey & Luthans, 1984; Warner, 1999).

- (6) *Fragmentation corollary*, that is, a person may effectively employ various construction subsystems which are inferentially not compatible with each other (Bannister & Fransella, 1971, p. 29). This implies that a person’s behaviour may not always appear logical or rational to an outside observer, but it is always consistent with the person’s internal schema or mental image, a notion that compares to what elsewhere is described as a “disjunction of the worlds” of the informer and the inquirer (Whitehead, 2004). EDTM arguably employs this corollary in its design by requiring the researcher to use and complement ethnographic interviews with participation observation in order to glean *emic* categories from the culture-bearers themselves (Rogers, 2003). That is, the inquirer has to shed off own ethnocentricity and be taught by the culture insiders while maintaining a distant *etic* perspective to help him or her to objectively make sense of the native perspectives (Gladwin, 1989a).
- (7) *Commonality corollary*. Bannister & Fransella (1971) argue that “to the extent that one person employs a construction of experience that is similar to that employed by another,

his processes are psychologically similar to those of the other person” (p. 30). In other words, groups of people construe events in similar ways despite the individuals having differing construction subsystems (Kahneman & Tversky, 1982; Murray-Prior, 1998). EDTM methodology may be said to incorporate this corollary in its design, in that it assumes that individual human behaviour has potential to predict group choice behavior (Sambodo, 2007).

- (8) *Experience corollary*, that is, an individual’s construction system changes as he or she successively construes the replication of events, implying as Murray-Prior (1998) put it that “a person’s motivation is born out a desire to predict and control his or her interaction with the prevailing social context” (Bannister & Fransella, 1971, p. 27). This somewhat may point to EDTM inquirer’s need to revisit the informant’s context to seek clarification of concepts and themes obtained from a previous ethnographic interview (Beck, 2005).

In conclusion, Murray-Prior (1998) while construing ‘aspects’ as ‘constructs’ and decision makers as scientists, postulates that people will ordinarily select those aspects or constructs with the best chance of enabling them to hopefully predict and control their social world. Murray-Prior (1998) further contends that the evaluation of ‘aspects’ is not necessarily a conscious undertaking on the part of the choice maker. The foregoing argument makes the personal construct theory consistent with the decision analysis phases of EDTM where aspects are pre-attentively and consciously selected (Gladwin & Murtaugh, 1980)

3.4.2 ‘Aspects’ and ‘Alternatives’ Defined

Natural decision-making involves selection of one alternative in a set of available options such as ‘adopt’ an ICT innovation’ and ‘do not adopt’ the innovation (Fjellman, 1976; Slovic et al., 1977; Tversky, 1972). Real-life theorists define an ‘alternative’ as a set of characteristics or aspects that influence the ultimate decision reached in the natural circumstances (Gladwin, 1976, p. 881-883). An ‘aspect’ on the other hand is articulated as a dimension, feature or attribute of an ‘alternative’ (Franzel, 1984; Gladwin, 1989a). A ‘decision criterion’ is thus viewed as an ‘aspect’ or ‘dimension’ that influences a decision maker to choose one alternative over another (Gladwin, 1976). Examples of decision criteria

may be profit, risk, capital, knowledge, cost, shape, functionality, safety or time-saving aspects etc. which may be quantifiable or non-quantifiable (Gomez, 2008; Gomez & Pather, 2011). The foregoing conceptualizations are premised on the Lancaster's (1966, p. 132) notion of consumer theory that '*goods are what they are thought of as goods*' with the implication that cognitive processes in the mind influence the ultimate choice of a decision maker (Cyert & March, 1963; Simon, 1967; Tversky, 1972). According to Tversky (1972), aspects may represent values of either quantitative or qualitative dimensions such as price, profit, quality, savings or other quantifiable gains, welfare and comfort, or they may even be arbitrary characteristics of the alternatives that do not fit into any simple dimensional structure. Moreover, aspects are a set of decision-making constraints of which the most significant one is initially used as the 'ordering aspect' which must be satisfied by all admissible alternatives (Murray-Prior, 1998, p. 542). According to Lancaster (1966), the utility of a product or service, from the perspective of a decision maker, derives from the aspects rather than from the product or service itself. The decision rules used in the selection of 'aspects' that is, the "reasons behind reasons" as Gladwin (1977) refers to them, are based on the self-schema or mental image of the decision context (Gladwin, 1979a; Gladwin, 1979b). The self-schema is the internal representation or model of the universe created out of the decision maker's experiences in a particular context (Murray-Prior, 1998).

3.4.3 EDTM's Theory of Real-Life Choice and its Assumptions

The theory of real-life choice fundamentally assumes that, when faced with a naturalistic situation demanding a choice between two or more alternatives, naturally people do not perform complex calculations of the worth or utility of each option in order to rank them first before choosing one (Gladwin & Barlett, 1980). The term 'naturalistic' implies that the nature of a real-life decision is such that there is neither formal preparation nor prior arrangement made by the decision maker before initiating the choice process (Fjellman, 1976; Quinn, 1971). The decision is made naturally without the use of formal methods such as linear programming, expected utility and stochastic dominance models (Gladwin, 1989; Gladwin, 1979; Lave & March, 1975; Schoemaker, 1982). Unlike the unnatural decisions which are infrequent and require a high degree of precision and accuracy, natural decisions occur frequently during the normal flow of everyday life and therefore require simplifying

procedures (Fjellman, 1976; Quinn, 1971). Although they are of strategic value just like the structured decisions, natural decisions are unstructured. That is, a natural decision is the outcome of a decision process that has not been encountered in quite the same form and for which no predetermined and explicit set of ordered responses exists in the organization (Mintzberg et al., 1976). Natural decision mechanisms employ the satisficing rather than the maximizing principle (Schank et al., 1977; Slovic et al., 1977). For example, to choose between cash, banker's cheque, or mobile payment modes in a business transaction, the MSME operator will not naturally rank each alternative based on pre-calculated worth. Instead, human beings employ procedures that naturally simplify the decision process and such procedures can be graphically represented using hierarchical models or trees that place the choice criteria at the nodes or branching points of the tree (Gladwin, 1976; Gladwin, 1979a; Gladwin, 1989a; Gladwin, 1979b).

Having explained the meanings of the notions of 'aspect' and 'alternative' in the context of EDTM in the above sections, we will now move on and state the assumptions underlying the theory of real-life choice that buttress the construction of and distinguish Gladwin's (1989a) multi-stage hierarchical decision tree models (EDT models) from other hierarchical models such as the lexicographic ordering models (Gladwin & Murtaugh, 1980). The latter model uses mathematical functions such as the importance function not ordinarily used by decision makers in a naturalistic setting (Fishburn, 1974). It should be noted however, that those other hierarchical models for instance, the lexical models are multi-criteria just like the ethnographic decision models, but they hinge on a different set of theoretical assumptions (Murray-Prior, 1998). As outlined in the next couple of paragraphs, Gladwin (1989a) posits both a theory about how people naturally make decisions and an empirical approach to investigate a given choice. As a methodology for studying naturalistic decision processes, EDTM is underpinned by the theory of real life choice (Gladwin & Barlett, 1980).

According to Gladwin (1989), the hierarchical theory of real-life choice used to underpin the construction of multi-stage hierarchical decision models in EDTM draws on Lancaster's (1966) and Tversky's (1972) studies and makes the following assumptions:

- (i) People adopt approaches that simplify naturalistic decision making processes and therefore choose one alternative out of the available set without engaging in complex computations of the utility value associated with each alternative (Fjellman, 1976; Gladwin, 1976).
- (ii) An alternative is a set of characteristics or aspects that influence the decision (Gladwin, 1976, p.881-883).
- (iii) An aspect is a dimension or feature of an alternative (Tversky, 1972).
- (iv) All aspects are discrete and not continuous (Gladwin, 1989a).
- (v) Continuous quantitative dimensions such as cost, profit etcetera are treated as constraints of the form $\text{Cost}_{\text{product}(i)} < \$ 6000$, or they are simply categorized in such a way that an 'ordering or semi-ordering with noticeable differences' of the alternatives of the form $\text{Cost}_{\text{product}(i)} < \text{Cost}_{\text{product}(j)}$ will influence the choice in a set of alternatives such as {Buy product(i), Buy product(j)} (Gladwin, 1989a, p. 14). This distinguishes the hierarchical decision tree model from a multi-criteria optimization model such as the one used in linear programming where criteria are linearly or lexicographically ordered by importance, and from a lexicographic decision model where the elements in a set of criteria are sorted using a linear importance order.
- (vi) To choose among several alternatives, the decision maker traverses multiple stages during the decision making process (Gladwin, 1989a).
- (vii) In the initial phase, the decision maker pre-attentively but rapidly eliminates all alternatives that exhibit some unwanted or unattractive aspects, using a process similar to that envisaged in the 'elimination-by-aspects theory' (Tversky, 1972).

While underscoring what has since been singled out as a potential weakness by some critiques, Gladwin (1976, p. 882) postulates that, in applying the theory of real-life choice as an investigative lens in the construction and subsequent validation of ethnographic decision models, the researcher's focus should not be on the psychological processes underlying the informant's decision. The goal rather, should be to unearth the context-specific aspects and constraints or decision criteria that underlie the informants' decisions in relation to the research phenomena (Gladwin, 1979). A focus on causal aspects and constraints or 'reasons behind reasons' when collecting data is essential in that the inquirer will have his or her

investigative eyes on the pertinent information actually used in making the decision being examined and thus sieve out irrelevant information that nonetheless may be provided in response to ethnographic interview questions (Gladwin, 1976). As elsewhere argued, some critiques have proposed that a deeper look at the psychological factors underlying a particular choice could help extend the scope of ethnographic decision tree modeling (Ajzen & Fishbein, 1980; Murray-Prior, 1998).

Arguably, the innate desire of people to simplify the natural decision process makes hierarchical decision trees an ideal approach to map out their choice process (Gladwin, 1989a; Quinn, 1971). Hierarchical decision trees provide ideal tools to present informants' opinions, attitudes and actions graphically in a more meaningful way (Franzel, 1984; Gladwin, 1983; Gladwin, 1989b). EDTM therefore, assumes that decision makers are experts on how they make their real-life decisions. For instance, a registered mobile banking agent does not have to consult in deciding how much electronic money to load in the mediating cell phone SIM card. Moreover, verbal descriptions of the insider's decision criteria as generated through a 'plain' anthropological study are inadequate for designing an intervention, hence the need for formal models and testing procedures proposed in EDTM (Beck, 2005; Gladwin, 1989a).

Factors such as the behaviour of significant others, environmental or contextual indications, and the messages received from authorities, media, family and peers also influence beliefs about behavioural dangers and protective actions. Such factors are deemed to have the potential to initiate a decision-making process that starts off with the identification of possible risks and ends with the implementation of a protective mechanism or action (Kang et al., 2006; Lindell et al., 2005). Thus beliefs, attitudes, intentions, expectations are all possible sources of the 'aspects' based on which a decision maker eliminates unfavourable alternatives (Ajzen & Fishbein, 1980).

EDTM as conceptualized by Gladwin initially seeks to identify the decision criteria from the informants themselves without having to examine the psychological processes underlying the decision, as do decision models underpinned by personal constructs theory (Kelly, 1955), the

theory of rational action (Fishbein & Ajzen, 1975), the theory of planned behavior (Ajzen, 1991), or the neoclassical economic models that support rational decision making with a view to maximize the expected utility or worth of an alternative subject to constraints (Gladwin, 1976; Shoemaker, 1982).

Subjective evaluation of the alternatives, choice criteria and constraints used by individuals in a decision-making context, gives shape and form to group behavior, and as Ezjen (1991, p. 202) postulates, ‘past behaviour is a possible predictor of future behaviour’. In light of this argument, Gladwin (1989a) contends that individual decision makers are ‘experts’ in making their own decisions (Gladwin, 1989, p. 9), a view further reinforced by Quinn (1975, p.4) where the author points out that group behaviour is largely a by-product of decisions made by individual members based on consideration of self-interest to join or leave such groups. Quinn (1975, p. 3) postulates that, “*Human behaviour is responsive to self-interest rather than obedient to societal norms and does not blindly obey custom, law and ideology*”. Quinn’s (1975) presupposition gives credence to Giddens’ structuration theory argument that human agency may possibly yield what from the vantage point of society norms and regulation may appear negative, non-normative and or unintended (Giddens, 1984). A ‘social organization’ unlike the ‘social structure’ is thus conceived of as the cumulative outcome of actual individual choices which may and do deviate from the structural norm (Firth, 2004).

Howard (1963) and Keesing (1967) follow Firth (2004) in their conceptualizations of decision-making models of social structure, which are categorized into (1) information processing models that is, the ‘present individual behaviour can predict the future group behaviour’ (Fjellman, 1976; Geoghegan, 1969), (2) retroductive models or retrospectively predictive models, that is, ‘the present can predict past’ (Howard, 1963; Murtaugh & Gladwin, 1980), and (3) models of cultural principles where domain-specific decision criteria are assumed to be uniquely ordered for all individuals (Keesing, 1967). In spite of the subtle and sometimes wide variations of the views they express, both cognitive psychologists (who focus on subjective evaluation of multi-attribute alternatives in natural decision-making processes) and social anthropologists (who focus on social structural questions) seem to appreciate the potential of decision models as an investigative tool to unearth natural decision

criteria, predict behavioral choice and shed light on the formation and variability of social structures (Gardiner, 1985; Gladwin, 1976; Quinn, 1975). The argument further provides a platform on which Gladwin's (1989a) EDTM claim that group behavioral choice can be inferred from individual decision processes. Gladwin (1989a) follows Goodenough (1956) and contends that group composition is the outcome of the choices made by individual members. This implies that the social structure at group level which anthropologists have unsuccessfully tried to characterize, classify and compare cross-culturally is an 'epiphenomenon' (Keesing, 1967) or 'emergent phenomenon' (Quinn, 1975). Therefore the individual decision is the mechanism that shapes the group structure, such that the laws governing the social structure can be discovered at the level of individual choice (Quinn, 1975). It has also been suggested that an ethnographic observer can make sense of group behaviour by investigating the multi-dimensional alternatives and their associated reward- and cost-based constraints open to subjective evaluation and consideration by an individual decision maker (Goodenough, 1956). The actual alternatives to be evaluated however, must be understood within the specific social-cultural context, meaning that decision model studies, from the vantage point of a relativist consider the realism of specific social-cultural setting critical (Fitzgerald & Howcroft, 1998; Quinn, 1975). EDTM decision makers arguably provide the human agency that produces and is reproduced by the social structure as conceptualized in structuration theory (Giddens, 1984).

Like other anthropological descriptions formulated in decision-making terms, EDTM methodology is arguably based on Goodenough's (1956, p. 29) assumptions that, first the alternatives open to members of a particular culture are finite and few in count since they are situationally constrained. Secondly, that the ethnographer's ability to determine the order of choices and conditions likely to alter that order is contingent upon the isolation of the choices and or alternatives provided by the culture (Goodenough, 1956; Harris, 1979), and thirdly that, after the discovery of the social-cultural alternatives, the next task of the anthropologist is to uncover how the individual decision makers of the social context being investigated choose among them. Quinn (1975, p. 23) further points out that while the order of choice of alternatives may be invariant, it is possible, that certain conditions may arise and significantly alter the attractiveness of such alternatives for different individual decision makers at

different times, with the implications that, first, the rewards and costs involved are considered, evaluated or weighed through active subjective judgment and that final decision cannot be reached automatically since the rewards or losses or any one alternative are not necessarily conspicuous and secondly, that a chance remains for different individual decision makers in similar contexts to make different choices. The foregoing arguments presumably, give credence to the concepts of time-space distancing and routinization in Giddens' structuration theory, and also to the use of ethnographic or discovery-oriented data collection techniques in the model-construction phase of EDTM methodology (Gladwin, 1989a; Gladwin, 1979). The fact that decision criteria and or considerations cannot be assumed to be widely agreed upon by individual informants, argues Quinn (1975, p. 7), introduces a new kind of variation into group behavioral choice, which is based on the individual differences in the subjective evaluation of multi-criteria alternatives with closely equivalent rewards and costs. Such variations are reflected in natural decision-modeling difficulties cited as (1), how to measure the value of a continuous consideration such as price and cost, and (2), how to factor out the relative contribution of each consideration or criterion to the overall value, worth or premium that an individual decision maker places on a particular multi-attribute alternative (Gladwin, 1989a). Quinn (1975, p.26) further contends that 'decisions are by their very nature matters of individual assessment and therefore of individual variability, not subject to ordered cultural principles as claimed by Keesing (1967) in his models of cultural principles, a notion that arguably, justifies and gives credit to the EDTM researcher's close ethnographic involvement with data subjects in their social cultural context.

EDTM methodology satisfies Quinn's (1975) tri-criteria of the decision model's adequacy namely: firstly specifying how the contextual natural circumstances delimit available alternatives, secondly specifying the way in which decision makers apply sometimes conflicting considerations to choose among this narrowed set of alternatives, and thirdly stating the way the model builders might predict the group decisions.

EDTM subjects the descriptive decision model to a validation test using an independent and presumably representative sample in order to generate a predictive decision model (Gladwin

& Murtaugh, 1980). The derived decision model is validated by using it to predict actual choices in known contexts or choices made in hypothetical situations (Goodenough, 1956).

3.5 Conceptual Model: Focusing an Ethnographic Study of a Cultural System

Ethnography being a holistic study of cultural systems, which, as earlier argued out, is an open-ended emergent learning process, requires an agreed upon understanding of the concept of culture so that when ethnographers and or anthropologists enter a cultural system, they have an idea of what to examine and or look for during their discursive interactions with the informants (Oats, 2005; Dey, Newman, & Prendergast, 2010). As a step towards achieving an ethno-perspective that is devoid of ambiguity in terms of what culture is, Whitehead (2004) thus proposes the use of the Cultural Systems Paradigm (CSP), which is a conceptual model comprising the 'human eco-system' and the 'cultural system' deemed a useful guide for an ethnographic study of a cultural system (Whitehead, 2004, p. 28). The Cultural Systems Paradigm is both a model for the interpretation of thick and complex ethnographic data and a tool to deal with emergent narrative responses considered vital though initially unforeseen and unrelated to the research questions (Whitehead, 2004). The Cultural Systems Paradigm (CSP) has evolved from the early 1980s and contains nine research categories founded on three key ethnographic principles namely,

- 1) The principle of universal human cultural categories, by which certain categories of phenomena are considered relevant across diverse human communities (Whitehead, 2004). This principle holds that the CSP's broad universal cultural categories are expressed in varying ways by members of different cultures (Harris, 1979; Myers, 1999). For instance, two groups of users of mobile banking drawn from among say MSMEs and large business corporations may express their usage behaviour in different ways. The ethnographer has to do undertake the work to decipher the specific cultural and individual expressions within the data categories (Whitehead, 2005).
- 2) The principle of paradigmatic flexibility, which states that the variations in behavioural and ideational expressions across cultural communities and individuals necessitate the design of highly flexible rather than rigid conceptual frameworks and models for use in the study of

cultural systems (Myers, 1999). As such Whitehead's (2005) Cultural Systems Paradigm is a flexible, non-rigid and non-limiting framework that could be extended by ethnographers if the study so demands. A caveat is placed that the Cultural Systems Paradigm is not exhaustive with the implication that it is offered as a useful tool to guide and focus the ethnographic research activities. Whitehead (2005) posits,

"Data that are stored in one CSP category at one point in the ethnographic process may be moved to or shared with another category as the ethnographer continues to learn about his or her host culture. The categories of the CSP are not necessarily permanent". (p. 8).

This study places an additional caveat that while CSP is a useful tool to focus the ethnographic interviews of the initial phase of EDTM, not all categories or aspects of CSP are necessary and that the choice of what to focus on must be informed by the research phenomenon (Agar, 1982; Mingers, 2001; Wildemuth, 1993). For instance, this thesis focuses more on the material culture category because of its association with the technological artifact (Harris, 1979).

- 3) The Principle of the interrelationship between Socio-cultural contexts, processes, and meanings. And as figures 3.13a and 3.13b intimate, the third principle holds that the emergence and persistence of human behaviours can be understood in light of the subject's socio-cultural setting, the socio-cultural processes of the informant's behavioural context and the meanings assigned by the culture bearers to their contexts and processes (Kroeber et al., 1952; Whitehead, 2005). This further reinforces the argument that fieldwork is an essential and indispensable attribute of ethnographic inquiries (Myers & Young, 1997).

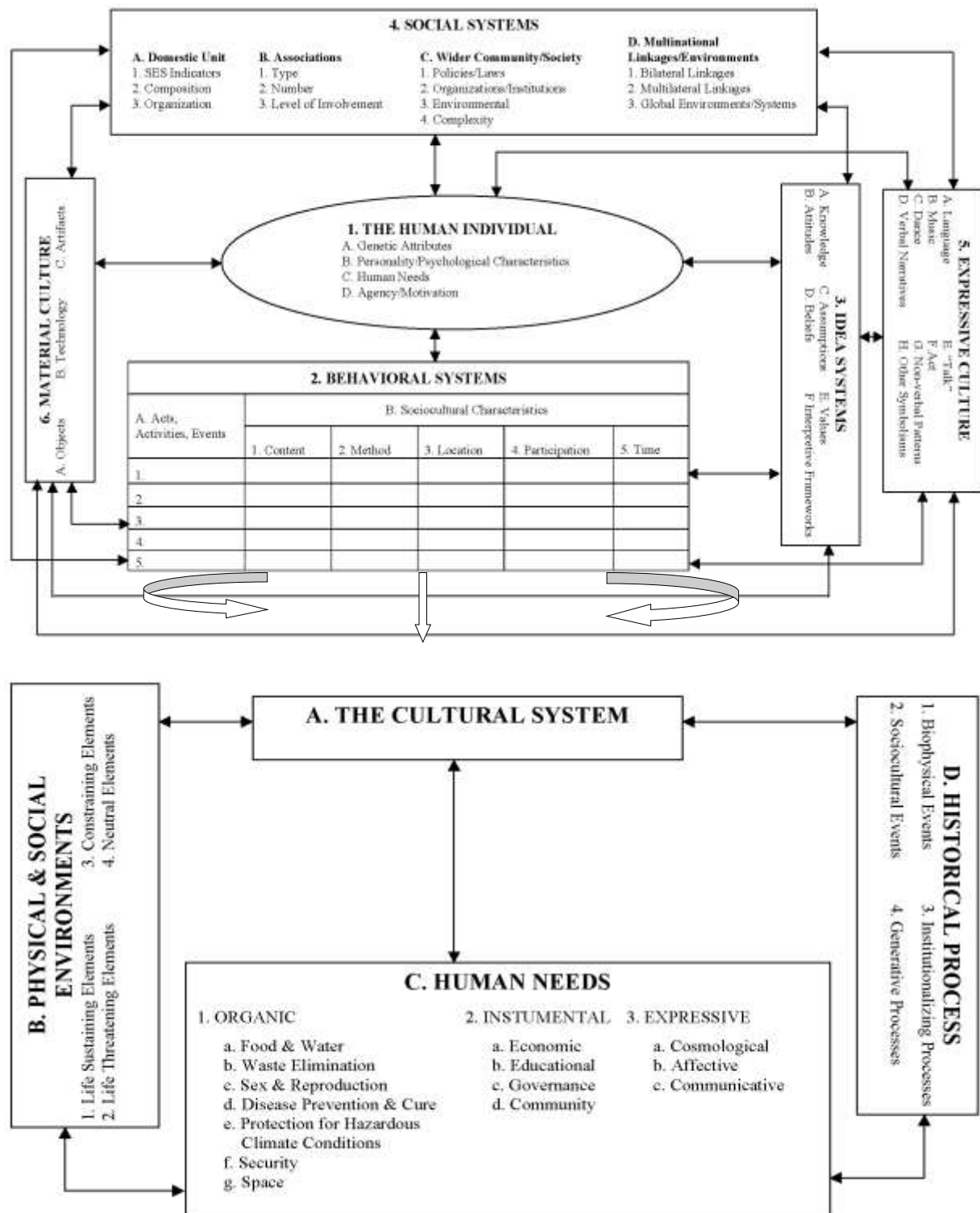


Figure 3.12b Cultural Systems Paradigm (CSP): The Human Eco-System (Whitehead, 2005)

3.6 Application of Hierarchical Decision Models in Naturalistic Decisions

Hierarchical decision models presume a two-phase decision process that is considered as a reliable model of the human choice behaviour in naturalistic contexts (Gladwin, 1979; Gladwin, 1979). The first phase in a natural human decision process entails a fairly rapid process in which the decision maker evaluates and narrows the available range of alternatives to a finite subset of two or three through elimination-by-aspects (Tversky, 1972). The initial stage is described as pre-attentive or unconscious processing of information because the process itself takes place ‘instinctively and nearly effortlessly’ (Murray-Prior, 1998, p. 543). The task does not involve mastery of procedures but it is accomplished fairly quickly and ‘secretly’ in the mind (Gladwin, 1976). As pointed out in the preceding paragraphs, the underlying assumption is that the natural decision maker chooses one alternative without rank-ordering the entire set of alternatives in advance as is the case with conventional microeconomic theorists (Fjellman, 1976; Quinn, 1971). As such the initial stage has been described as a form of ‘internal processing of information occurring outside of a decision maker’s attention and awareness’ (Gladwin & Murtaugh, 1980, p. 117). As a pointer to the simplification procedures employed in naturalistic decision processes, behavioural theorists postulate that, owing to their limited information processing potential, people will often use simplifying heuristics wherever possible including hierarchical or sequential processing methods to handle complex decision situations (Fjellman, 1976; Gladwin, 1977; Quinn, 1971). The contention that human beings have limited computational power naturally and therefore seek to mitigate their deficiency by adopting approaches that make decision making processes easier and faster is shared by many real-life decision theorists (1980; Quinn, 1971; Slovic et al., 1977). When faced with a choice of one out of a set of available alternatives, Gladwin (1976) posits,

“People do not make complex calculations of the overall utility of each alternative. Rather, people use procedures that simplify their decision-making calculations” (p. 881).

The second phase is generally perceived as an algebraic form of ‘maximisation subject to constraints’, since the decision maker subjects the finite set of the alternatives arrived at in stage one, to the ‘hard core’ phase of the real-life choice process (Gladwin & Murtaugh,

1980). The alternatives are ordered against a seeming ‘principal aspect’ and evaluated against the other secondary aspects, with the decision maker selecting the alternative that satisfies both the ‘principal’ as well as the ‘secondary’ aspects as the highest ranked alternative (Gladwin, 1977). Thus the ‘hard-core’ of the decision process entails choosing one aspect as the ‘ordering aspect’ and using it to order the two or three alternatives passed from stage one (Gladwin, 1989a; Gladwin, 1979a). An example of an ‘ordering aspect’ in the context of this study is,

$$\text{Service-cost-of}_{\text{Alternative-1}} > \text{Service-cost-of}_{\text{Alternative-2}}$$

Using the “unless-conditions” (Gladwin, 1989a, p. 42-43), the decision maker further formulates ‘*constraints*’ from the remaining aspects, for instance,

Constraint 1: *service speed of_{option-1} > service speed of_{option-2}*

Constraint 2: *system security of_{option-1} > ‘system security of_{option-2}*

·
·
·

Constraint n: *Aspect_{option-1} < Aspect_{option-2}*

and passes each ordered alternative through all the constraints. If the alternative ranked first on the ‘ordering aspect’ fails to satisfy all the constraints, the second alternative is picked and likewise passed though the same list of constraints. In the event that none of the options or alternatives satisfies all the constraints, the decision maker adopts another strategy (Tversky, 1972). Gladwin & Barlett (1980) conceptualize a *criterion* as a standard that is used for judging an *alternative* while a *constraint* is considered as any *aspect* that limits the decision maker’s freedom to choose what he or she wants. ‘Constraints’ are represented by the “unless conditions” which limit the freedom of the decision maker to choose the alternative that he or she wants (Gladwin, 1989a, p. 20). The “hard-core” phase of the choice process is therefore seen as an algebraic form of “maximisation subject constraints”, a principle of decision making inherent in micro-economic models of rational choice (Ajzen, 1991; Fishbein, 1979; Gladwin, 1989a). Gladwin (1976) contends that the ‘hard-core’ phase is algebraic since there is ‘ordering’ of alternatives on an aspect rather than ‘maximization’ of a continuous aspect. Unlike the rational choice based micro-economic models that seek to maximize options on a continuous aspect such as profit, returns and savings, ethnographic decision tree modeling which is based on the hierarchical theory of real-life choice, simply orders the alternatives on

an aspect algebraically making it possible for the process to be represented using a computer algorithm, a flowchart, a decision table, a decision tree or by a set of if-then decision rules (Gladwin, 1976, p. 882).

EDTM is nonetheless more inclined to the use of hierarchical decision trees (Gladwin 1989). A decision tree is defined as “*a sequence of or series of discrete decision criteria all of which have to be passed along a path to a particular outcome or choice*” (Gladwin, 1979b, p. 657). Tree models are used because they have been proven to possess predictive potential when used by anthropologist and or ethnographers to predict 85% to 95% of the actual decisions of individuals (Murtaugh & Gladwin, 1980). For instance hierarchical decision tree models have been used to predict farmers’ cropping decisions (Gladwin, 1977); people’s decisions to recycle cans (Ryan & Bernard, 2006); fish-sellers marketing decisions (Gladwin, 1971); peoples’ car-buying choices (Murtaugh & Gladwin, 1980) as well as telecenter usage’ decisions (Bailey & Ngwenyama, 2013) and the decision criteria used by baby boomers with mobility impairments in choosing enabling indoor technologies (Davenport, 2007), while flowcharts have been used to predict people’s treatment choices (Barlett, 1977) as cited in Gladwin (1979).

As figure 3.13 illustrates, EDTM’s multi-stage model is a combination of Tversky’s (1972) ‘elimination-by-aspects’ theory (underpinning stage one) and the micro-economists’ ‘maximization-subject-to-constraints’ theory (underpinning stage two) of the natural human decision process as behaviorally modeled using a hierarchical decision model (Gladwin, 1979; Gladwin & Murtaugh, 1980).

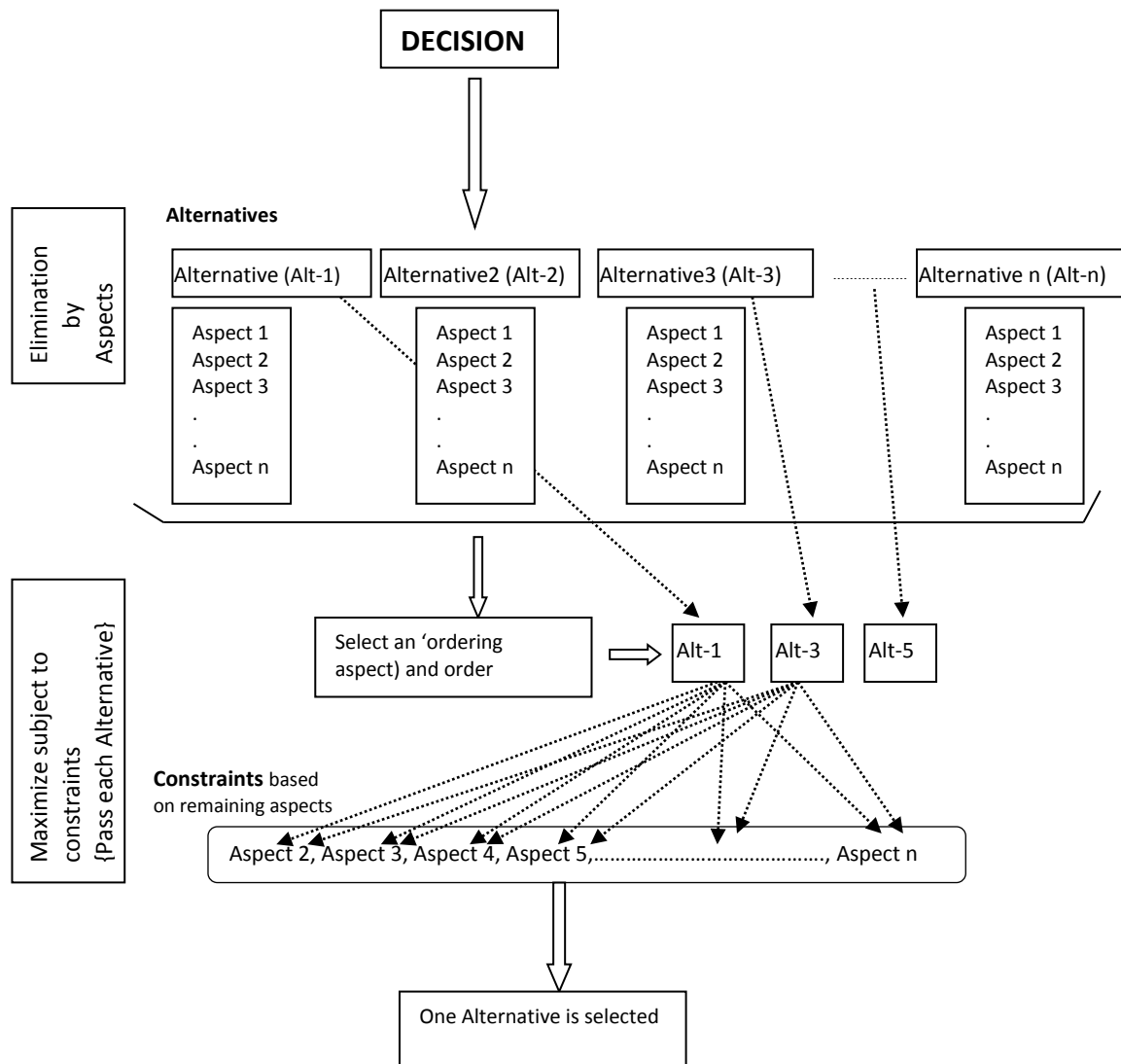


Figure 3.13 Pre-Attentive and Maximization Subject-to-Constraints Phases of the Hierarchical Decision Process: A Focus on the Cognitive Processes of a Natural Decision Maker (Derived from Gladwin (1989a) and other behavioral decision theorists).

The above cognitive stage-wise decision process is constructed based on a critical review of the works of several behavioural decision theorists (Bailey & Ngwenyama, 2013; Beck, 2005; Gardiner, 1985; Gladwin, 1989a; Lancaster, 1966; Murray-Prior, 1998; Simon, 1967; Tversky, 1972). Real-life choice theory provides a theoretical perspective that permits an EDTM inquirer to sift through the ethnographic interview data to unearth the decision criteria represented by ordering of alternatives on some aspect, by semi-orders of the form such as ‘twice as much’, or by contrasts (Gladwin, 1989a).

According to Franzel (1984, p. 200) there are three categories of decision criteria that underlie a decision in real-life theory namely,

- 1) Orderings of alternatives on some attribute (Franzel, 1984; Gladwin, 1983). For instance, ‘total cost of means A (ATM transaction) is lower than that of means B (mobile banking service)’ is a form of ordering of alternatives.
- 2) Explicit choices where the performance of one attribute is more important than performance on another attribute (Franzel, 1984). For example, although ATM is cheaper than mobile banking, the latter is chosen since it is considered less risky and ubiquitous.
- 3) ‘Constraints’ that “must be passed or satisfied” for an alternative to be picked (Franzel, 1984, p. 148). For instance, ‘advance subscription to a mobile network’ and ‘having an account with a bank offering mobile banking service’ are both constraints that influence adoption.

Ethnographic decision trees provide a simple natural process to predict the actual choices of individuals or group behavior with a reasonable degree of accuracy. They represent a means to “copy the living brain” to explain the adaptive human behaviour of the choice maker (Gardiner, 1985, p. 26).

3.6.1 Factors Likely to Diminish Predictability of Hierarchical Decision Models

Whereas there is a corpora of literature of decision tree models as useful tools of investigating natural human choice behaviour, extant literature is equally awash with caution on possible causes of weaknesses and limitations that a modeler must keep a keen eye on during the study (Gladwin, 1989b). The loss of the decision model’s predictability potential, according to Quinn (1975, p. 25) may be attributable to:

- 1) Narrowing of the gap between alternatives in terms of their respective benefits and costs. For instance decision maker, may be unable to discriminate among a set of multi-dimensional alternatives when the differential advantages among them is infinitesimally small, thus prompting the decision maker to resort to: inconsequential and or petty considerations such as random choice to wade off uncertainty, making a choice based on seemingly spatial or temporal salience of one alternative over others, or pre-attentively

deciding which way or choice to make based on ‘mood’, ‘inclination’ and ‘whim’ factors. Such criteria or considerations, according to Quinn (1975, p. 25) are “temporary, idiosyncratic and non-verbalised” and therefore difficult for the ethnographers to identify.

- 2) Loss of decision model predictability may also result from the fact that different individuals may subjectively evaluate or assign different values to the same criterion and arrive at different decisions, a weakness which is amplified when values or perceived worth of available alternatives are significantly close thus increasing the possibility of different alternatives to be chosen (Quinn, 1975).
- 3) Variability of individual decision maker’s self-interests may likewise decrease predictability of the model, especially when seen in light of the contention that group structures are by-products of some common set of interests shared among the individual members (Quinn, 1975).
- 4) The fourth possible minimiser of model predictability is having an extremely high degree of multi-factor dependent uncertainty regarding the decision consequences in the decision making context. Tversky & Shaffir (1992, p. 305) posit, “...*in the presence of uncertainty, people are often reluctant to think through the implications of each outcome and as result may violate the sure-thing principle*”. The theory of the sure-thing-principle, cited as a basic maxim underpinning the theory of rational decision-making under uncertainty, assumes that ‘if prospect X is preferred to Y knowing that event A did not occur, the X should be preferred to Y even when it is not known whether A occurred’ (Tversky & Shafir, 1992).
- 5) The fifth possible cause of possible model weakness is failure by the EDTM researcher to use different samples for model-building and model validation phases (Gladwin 1989a, p. 47-48). To make the model’s test of adequacy water-tight, Gladwin (1989a) recommends that the inquirer uses “two test samples” (p. 47).

Gladwin (1989a) follows Lave & March (1975) and argues that since a model contains only some of the characteristics of reality, it is naturally possible to have many different models of the same thing, each of which examines a different aspect. Multiple ethnographic decision tree models provide a kaleidoscope of the research phenomenon and its context (Lave & March, 1975).

3.7 Commensurability between Structuration Theory and EDTM's Real-Life Theory

Perceived empirical deficiencies of structuration theory have led IS authors to propose remedial approaches such as 'duality of technology' (Orlikowski, 1992), 'adaptive structuration theory' (DeSanctis & Poole, 1994), 'actor-network theory' (Tatnall & Gilding, 1999) etc. Admittedly, structuration theory neither supports a particular research approach nor is it a source of testable propositions and as Jones & Karsten (2008) contend, its raw concepts may not help in the actual execution of empirical research. Accordingly, Giddens (1984) counsels social scientists to use the concepts of his theoretical framework in a critical and sparing manner and not in toto (Jones & Karsten, 2008). Therefore this thesis has employed structuration concepts as "sensitizing devices" (Jones & Karsten 2008, p. 134) to logically explain what is going on in the research context of Kenya's mobile banking platform. Structuration theory has earned itself varied descriptions such as 'second-order theory', 'meta-theory', 'a world view', 'generic category' from critics who postulate that the theory, being 'a way of thinking about the world rather than an empirically testable explanation of research phenomena', is unsuitable for empirical research analyses (Bryant & Jary, 1991; Weaver & Gioia, 1994). This study follows Stones (2005) and Jones & Karsten (2008) and argues that IS research stands to gain by engaging with structuration concepts when complemented with an explicit cognitive research methodology such as the ethnographic decision tree modeling (EDTM) with which the theory is arguably commensurable.

Mingers & Brocklesby (1997, p. 497) take issue with the objective-subjective duality and argue that it is possible to build bridges across the apparently impenetrable boundaries of conventional paradigms. Structuration arguably illustrates the inseparability of the objective and subjective dimensions, by conceptualizing reality as the outcome of the dialectic interplay between forces of structure and agency meanings (Giddens, 1984). Therefore, structural regularities are seemingly created out of subjective meanings and through socialization processes, with resultant structures acting back upon the agents' meanings, making it necessary to simultaneously examine the closely interlaced phenomena of structures and meanings in order to gain a comprehensive understanding of a social system (Whittington, 1992).

Like structuration theory, which through, EDTM methodology's ethnographically intensive and interpretive phase in which the researcher examines the cognitive processes including the decision criteria of the informants, confers an opportunity to expose fears, interests, hidden agendas, tacit manipulations, concealed inequalities, conflicts as well as contradictions that characterize the interactions between ICTs and their socio-economic, political and organizational environments (Myers & Young, 1997). And as Geertz (1973) posits,

“Ethnography is actually situated between powerful systems of meaning. It poses its questions at the boundaries of civilizations, cultures, classes, races and genders. Ethnography decodes and recodes, tilling the grounds of collective order and diversity, inclusion and exclusion. It describes processes of innovation and structuration and is itself part of these processes” (p. 2)

For instance, an MSME may switch to a rival mobile banking service provider because of observed high tariffs. The co-presence of actors that allows them to communicate using modes such as facial expressions, bodily gestures, linguistic constructs etc., social identities and the position-practice associated with them are definers in the “virtual time-space of structure”, which mark the boundaries of normative rights (for example, MSMEs voluntarily adopt mobile banking), obligations (for instance, the MSME loads airtime and keeps the service PIN secret), and sanctions (e.g. service denial to MSME deriving from illegitimate use of technology such as failure to repay a micro-loan previously advanced through the cell phone).

Table 3.4 explores the shared philosophical underpinnings that arguably make structuration theory and EDTM commensurable.

Table 3.4 Exploring Aspects that Make Structuration and EDTM Commensurable

Commensurability Factors	
Structuration Theory (Giddens,1984)	EDTM (Gladwin, 1989)
Conceptualises a form of agency that is voluntaristic since the envisaged social actors are knowledgeable and possess the capability to make choices	Decision-making actor is viewed as an expert having capability to evaluate several available alternatives based on known criteria that are comparable to the “practical consciousness” agents in structuration theory
Interpretive research orientation: places a high premium on language declaring it as the key medium through which human action is mediated (Giddens, 1979).	Interpretive research orientation: uses ethnographic interviews, also mediated through language as the primary means of data elicitation (Spradley, 1979).
Accommodates statistically oriented hard-edged approach in analysing social behaviour while maintaining the view that social science is irretrievably hermeneutic.	Has a linear hypothesis-testing phase.
Neither romanticize the subject’s imperialism nor fantasizes the supremacy of the social object. The theory endears itself to the proponents of pluralism who proscribe philosophical as well as methodological monisms (Firestone, 1990; Iivari, 1991).	Methodologically pluralistic and employs ethnographic interviews, participant observation, and surveys (Bailey & Ngwenyama, 2013).
The agent’s knowledgeability constitutes the actor’s cognitive skills involved in the human action (Jones & Karsten, 2008)	Relies on human cognitive processes to extract the decision criteria (Andergassen, et al., 2009) Views cognitive science as an ideal approach to get feedback from those people targeted by a technological initiative (Gladwin, 1989a).
Situated social actors are knowledgeable agents that use their ‘stratification model’ to reflexively monitor the on-going flow of social life in order to exercise control and attain continuity of the interaction. Although the actor’s knowledgeability is grounded on ‘practical consciousness’ or ‘mutual knowledge’, it is also bounded on one hand by his or her ‘discursive consciousness’ and on the other by the ‘unconscious motives and cognition’ (Giddens, 1984).	Embraces reflexivity by assuming that, while a decision maker in a natural setting does not rank-order the available alternatives before choosing one, he or she engages in reflexive pre-attentive and unconscious evaluation of the decision criteria using the process of ‘elimination-by-aspects’ (Gladwin, 1989a; Quinn, 1971). The social actor’s self-consciousness is implied.
Conceptualises a human being as a purposive agent, who has ‘reasons’ for his or her activities and is able to elaborate those reasons	Conceptualises decision makers as relying on a set of criteria or constraints that underlie their natural choices (Beck, 2005).
Neither wields “a methodological scalpel”, nor prohibits the use of any specific research technique such as survey methods, questionnaires etc. and may be seen as embracing a trans-paradigmatic empirical approach. Entrenches the pivotal role of ethnography	Ethnographic research interviews and participant observations are fundamental to EDTM and forms a key component of its mixed method approach. NB: Both approaches are deeply context-specific

	(Pettigrew, 1985).
Dispels the notion that validity is merely based on the specific data collection and analysis techniques employed and holds that the claims of sociology do not rest distinctively upon hard-edged research, and that all social research no matter how mathematical or quantitative, presumes ethnography	Its first phase is profoundly ethnographic. Employs ethnographic interviews to unearth the ‘decision criteria’ that are comparable to structuration theory’s ‘reasons’ for human action.
Examines the structures and relations of power, legitimation, and communication among situated social actors (Jones & Karsten, 2008). Conceptualises a research context that includes time-space boundaries, reflexive monitoring of interaction by a social actor in order to know what’s going on in order to exercise power.	Decision makers are viewed as experts in their own behavioral choices and therefore ethnographic approaches are ideal for collecting context-sensitive data from them as informants (Murray-Prior, 1998).
Accommodates the objective-subjective aspects of reality, elsewhere portrayed by traditional paradigms as strange bedfellows (Fitzgerald & Howcroft, 1998).	Sequentially combines an initial inter-subjective ethnographic research phase with an objective quantitative phase as if to confirm Ormerod’s (1997, p. 421) argument that “ <i>a cross-paradigm methodology is philosophically feasible</i> ”
Articulates a ‘structure’ as a “virtual order of transformative relations that exist as time-space presences instantiated in human action and as ‘mental traces’ or ‘stocks of knowledge’ that orient the social practices of knowledgeable actors” (Giddens, 1984, p. 17). Those ‘stocks of knowledge’ are also described as ‘rules and resources’ that exist in the head of knowledgeable agents and which aid them to ‘go on’ in routine encounters (Boland, 1996, p. 693; Scapens & Macintosh, 1996).	Focus on high-level mental abstractions or ‘mutual knowledge’ that are only instantiated in human decisions. The nature of the agents’ ‘mutual knowledge’ is comparable to the ‘decision criteria’ used by a decision maker to make a choice in a natural setting in EDTM, an empirical method that maps out the cognitive processes involved in decision-making (Gladwin, 1989a; Murray-Prior, 1998).
Uses a hermeneutics lens to uncover social relations and structures of signification, domination and legitimation.	Employs an interpretive research frame

3.8 Conclusion

Structuration theory is arguably an ideal theoretical lens for viewing the micro and macro social relations and social structures as well as human and institutional agency within the research context in order to make sense of the aspects of interactions between MSMEs and other entities through mobile banking IT artifact. By not wielding ‘a methodological scalpel, structuration theory leaves the researcher with a level of empirical flexibility to choose an appropriate method and techniques for data collection and analysis whether interviews, surveys or questionnaires (Giddens, 1984). Moreover, the ‘rules and resources’ that constitute

the structure or structural properties of social systems exist only in the agents' heads (Giddens, 1984). Such aspects of cognition, argues this thesis may be examined using a cognitive empirical research approach which makes EDTM an appropriate method to extract the decision criteria (Bailey & Ngwenyama, 2013; Gladwin, 1989a). Whereas structuration theory uses such cognitive notions as discursive, practical consciousness, and unconscious cognition and motives to define, describe and delimit the knowledgeability of social agents, EDTM on the other hand sees social actors as experts in their decision making process and alludes to the notions of pre-attentive, unconscious levels of cognition (Giddens, 1984; Gladwin & Murtaugh, 1980). Therefore structuration theory, offers a theoretical lens to make sense of the invisible social structure in the agents' heads that constitute the social system implicated in the mobile banking transactions, while EDTM provides an empirical approach to investigate the cognitive processes that underlie adoption and usage decisions (Bailey & Ngwenyama, 2013).

Chapter 4: Research Methodology

4.1 Introduction

Chapter 4 describes the underpinning scientific philosophy, the research strategy and design. The chapter also provides a detailed meta-analysis of the literature and brings to the fore the origins, development and applicability of ethnographic decision tree modeling (EDTM), the methodology used in this thesis. While the need for an elaborate research design and focus cannot be gain-said, scholarly research is more often than not faced with many challenges for which there are no hard-and-fast rules to resolve, and this consequently leads to subtle differentiations in the design of various studies. According to Patton (2002, p. 228), there is no rule of thumb to guide an investigator on how to precisely focus a study. It's the study's purpose, the researcher's interests, available time and resources that determine the breadth and narrowness of a study.

Therefore diverse methodological orientations have been accepted in the IS domain including ethnography, action research, grounded theory, thematic and content analyses (Boyle, 1994). Nonetheless, given the nature of the phenomena under investigation in this thesis, the time limit availed by the IS Department rules in the Commerce Faculty of the University of Cape Town for IS doctoral research, the overarching research questions, the assumptions stated in section 1.4.5 and the theoretical underpinnings discussed in chapter 3, a qualitative research underpinned by the scientific philosophy of interpretivism has been employed in this study (Walsham, 1995; Walsham, 2006). This matter is further taken up more elaborately when outlining the philosophical worldview for the study in section 4.2.

Any research approach which separates ontology from methodology is vehemently contested on the premise that such a myopic separation is a recipe for theoretical sterility (Archer, 1995. Archer (1995) posits,

“An ontology without a methodology is deaf and dumb; a methodology without an ontology is blind. Only if the two go hand in hand can we avoid a

discipline in which the deaf and the blind lead in different directions, both of which end up in cul de sacs” (p. 28).

Archer’s (1995) argument has however been strongly contested by many authors particularly in the mixed- and multi-method research orientations (Feilzer, 2009; Lieberman, 2005; Sawyer, 2001). For instance, Robey & Markus (1998) argue that paradigmatic incommensurability at the ontological and epistemological heights need not be translated to methodological and axiological levels, while Firestone (1990) points out that in the practice of research, walls separating paradigms break down since it is not possible to remain in the philosophical domains and avoid methodological specifics (p. 123). Arguably, strict methodological regimens as well as rigid methodological monisms are untenable in the IS domain because of their inherent potency to lead to anarchism (Gage, 1989; Gioia & Pitre, 1990).

This study uses ethnographic decision tree modeling (EDTM), which is essentially a qualitative research methodology which begins with a large interpretive and intensive research component covering the initial ethnographic discovery-oriented phase, followed by a quantitative phase whose deliverables are three predictive ethnographic models (Gladwin, 1989b). This thesis research qualitatively investigates a set of concepts and relationships that explain the socio-cultural context, socio-cultural processes, meanings and behaviour, structural practices, and rules relating to the adoption and use of mobile banking by MSMEs in a developing country context (Whitehead, 2005). As figure 4.1 later shows, EDTM incorporates a qualitative discovery-oriented phase and a quantitative hypothesis testing phase to achieve triangulation (Denzin, 1978; Denzin, 1970). While rooting for the freedom of epistemological perspectives and flexible methodological orientations, Orlikowski & Iacono (2001, p. 131) contend that different types of qualitative and quantitative studies are needed to enhance our theoretical understandings of IT artifacts and that researchers much take the IT artifacts more seriously.

4.2 Research Philosophy

The term ‘philosophy’ has been defined within the scholastic research domains as the critical examination of the grounds for a belief system and the basic constructs used to express such beliefs (Dobson, 2002). Archer (1995) contends,

“The nature of what exists cannot be unrelated to how it is studied, and therefore the social ontology endorsed does play a powerful regulatory role vis-à-vis the exploratory methodology for the basic reason that it conceptualises social reality in certain terms, thus identifying what there is to be explained and also ruling out explanation in terms of entities or properties which are deemed non-existent” (Archer, 1995, p. 16-17).

Research philosophy enforces coherence across three key components of a scholarly study namely the ontological, epistemological and methodological assumptions (Archer, 2005).

4.2.1 Ontology

Ontology refers to the ‘nature of reality’ that is, ‘*what there is to study*’, also perceived as the ‘nature of what is being studied’ or ‘what is knowable’ (Fitzgerald & Howcroft, 1998; Mingers, 2001). Arguably there exist two main ontological orientations namely, realism and relativism. A ‘realist ontology’ assumes the existence of a hard objective reality (Fitzgerald & Howcroft, 1998). A ‘relativist ontology’ on the other hand argues that there is no absolute truth and that the nature of the phenomenon under study or reality could potentially vary across diverse socio-economic, political, experiential and personal or situational contexts (Guba & Lincoln, 1994; Whitehead, 2005). Since decision criteria are capable of changing in different contexts, relativism was chosen to underpin this research (Gladwin, 1989a).

4.2.2 Epistemology

Epistemology refers to the ‘nature of knowledge’ that is, ‘*how we can know about or understand the object of knowledge*’. The two main epistemological orientations are positivist epistemology which assumes that exact objectivity is achievable by separating the researcher from the subjects so as to minimize bias and enhance generalizability of results (Fitzgerald & Howcroft, 1998; Wildemuth, 1993) and interpretive epistemology which perceives contextual

knowledge about the research phenomenon as a product of inter-subjective interaction between the investigator and the informants (Guba & Lincoln, 1994; Walsham, 2006).

The debate on the research philosophy has led to the evolution of alternative epistemologies, some of which are briefly described below.

(i) Positivism

Positivism assumes that there is an objective reality that exists independent of the knower and that such reality is best expressed through observable statistical regularities of behaviour (McEvoy & Richards, 2006; Wildemuth, 1993). From a positivist standpoint Kerlinger (1986, p. 10) defines research as ‘the systematic, controlled, empirical and critical investigation of natural phenomena guided by theory and hypotheses about the presumed relations among such phenomena’. Positivist studies are designed to maximize generalizability to a larger population from a finite set of selected variables with the corollary that sample representativeness is imperative and indispensable (Fitzgerald & Howcroft, 1998; Kerlinger, 1986). A positivist researcher uses his own constructs or etic categories to formulate and test formal propositions in terms of independent and dependent variables (Lee, 1991).

(ii) Interpretivism

In sharp contrast to the positivist notion of objective reality, interpretive research paradigm assumes that reality is socially constructed (Klein & Myers, 1999; Walsham et al., 2007). Interpretivism emerged out of the theory of social construction in which society is viewed as both a human product (externalization) and as an objective reality (objectivation) while man is regarded as a social product (internalization) (Berger & Luckmann, 1966). The theory of social construction conceptualises the three dialectic moments of social reality (bracketed in the previous sentence) as follows: *Externalization* is conceptualised as the process by which ephemeral and routine human interactions create new social constructions while altering those that exist. *Objectivation* is conceptualised as the process by which a social construction acquires the character of objectivity such that an individual experiences it as ‘given’ or ‘as is’. *Internalization* is the process by which a person appropriates a social construction and becomes an agent through whom the social construction may occur (Berger & Luckmann, 1966).

Interpretivist research hinges on a relativistic ontology and assumes that human beings and social artifacts created by them are differentiated from the physical reality which natural science investigates (Fitzgerald & Howcroft, 1998). People differ from atoms, molecules and electrons in that they attach their own meanings to the world around them and to the behaviours they express” (Lee, 1991, p. 347). Therefore the same social artifact may convey diverse meanings to different informants and to the investigating social scientists (Lee, 1991).

Interpretive studies are more inclined towards the qualitative exploratory research programmes oriented towards the capture and description of social actors’ symbolic and cognitive processes. That is, making sense of the social world from the viewpoint of the social actors themselves by striving to ‘know what they know, see what they see and understand what they understand’ (Wildemuth, 1993). Interpretivist research orientation places a higher premium on the informants’ subjective meanings unlike positivism where the aim is to minimize the knower’s subjectivity and bias (Becker & Niehaves, 2007; Klein & Myers, 1999). Therefore interpretivism has been used to underpin ethnographic studies as well as studies of symbolic interactionism (Myers, 1999).

(iii) Post-Positivism

Unlike interpretivists, post-positivists are scholars who believe that a rejection of positivism does not warrant a wholesome rejection of realism or the scientific goals of objectivity and value free inquiry (Phillips, 1990). Thus as realists, post-positivists equally believe in a hard and solid reality of physical and social objects that exist independent of the investigator (Fitzgerald & Howcroft, 1998; Mingers, 2001). As such an ontology stemming from a realist foundation provides a basis for the generation of knowledge in the post-positivist tradition. The epistemological, methodological and axiological assumptions of post-positivists derive from three interlinked notions. Firstly, that knowledge can best be gained through a search for regularities and causal relationships among components of the social world. Secondly, that regularities and causal relationships can best be discovered if there is a complete separation between the investigator and the research subjects. And thirdly, post-positivists embrace the use of scientific methods to enhance the detachment of the knower from the research context

but reject the possibility and necessity for a complete distinction between the investigator and the research context (Kaplan & Duchon, 1988; Teddlie & Tashakkori, 2008; Weber, 2004).

(iv) Critical Realism

With its foundation in Roy Bhaskar's transcendental realism, critical realism accuses the monistic positivists of 'epistemic fallacy' arguing that such a philosophical orientation potentially reduces the question of 'what is' to one of 'what we can know' (Archer et al., 1998). Critical realism takes issue with the notion of objectivity adhered to by the canons of strict positivism, who seek to detach the knower from the research site with the aim of reducing his or her bias as well as other so-called contaminating effects (Fitzgerald & Howcroft, 1998). Critical realists acknowledge that statistical procedures of the positivist paradigm can be used to validate the existence of generative mechanisms, tendencies and ways of life, which are causally responsible for the observable phenomena of the world (Archer et al., 1998; Mingers, 2004). Critical realism does recognize the existence of an objective reality but in the intransitive unchanging dimension as well the efficacy of inter-subjective constructions of shared human cognition (Walsham, 2006). A major imperative of critical realism is that it embraces *causality*, which is an aspect of positivism as well as *social construction* of knowledge, which is an aspect of interpretivism (Archer et al., 1998).

Proponents of critical realism advance the notion of a society that pre-exists agency thus taking issue with Giddens' notion of structural duality which they describe as the fallacy of central conflation of structure and agency (Archer, 1990; Clark et al., 1990). Although it embraces positivist and interpretivist research traditions, a critical realist perspective makes empirical observations and then seeks to retroductively investigate the generative mechanisms responsible for the observed state of affairs (Bhaskar, 1978). In this study, critical realism has been ruled out given the nature of the research phenomenon where the investigator's focus is to unearth the decision criteria of MSME owners and managers as a pointer to unintended consequences of mobile banking usage in Kenya. This is arguably more of an inductive investigation process than it is retroductive (Archer et al., 1998).

Table 4.1 ‘Soft’ Interpretive versus ‘Hard’ Positivist Research Dichotomies: Sourced from Fitzgerald & Howcroft (1998, p. 10)

SOFT	HARD
ONTOLOGICAL LEVEL	
Relativist Belief that multiple realities exist as subjective constructions of the mind. Socially-transmitted terms direct how reality is perceived and this will vary across different languages and cultures.	Realist Belief that external world consists of pre-existing hard, tangible structures which exist independently of an individual's cognition.
EPISTEMOLOGICAL LEVEL	
Interpretivist No universal truth. Understand & interpret from researcher's own frame of reference. Uncommitted neutrality impossible. Realism of context important.	Positivist Belief that world conforms to fixed laws of causation. Complexity can be tackled by reductionism. Emphasis on objectivity, measurement and repeatability.
Subjectivist Distinction between the researcher and research situation is collapsed. Research findings emerge from the interaction between researcher and research situation, and the values and beliefs of the researcher are central mediators.	Objectivist Both possible and essential that the researcher remain detached from the research situation. Neutral observation of reality must take place in the absence of any contaminating values or biases on the part of the researcher.
Emic/Insider/Subjective Origins in anthropology. Research orientation centred on native/insider's view, with the latter viewed as an appropriate judge of adequacy of research.	Etic/Outsider/Objective Origins in anthropology. Research orientation of outside researcher who is seen as objective and the appropriate analyst of research.
METHODOLOGICAL LEVEL	
Qualitative Determining what things exist rather than how many there are. Thick description. Less structured & more responsive to needs & nature of research situation	Quantitative Use of mathematical & statistical techniques to identify facts and causal relationships. Samples can be larger & more representative. Results can be generalised to larger populations within known limits of error
Exploratory Concerned with discovering patterns in research data, & to explain/understand them. Lays basic descriptive foundation. May lead to <i>generation</i> of hypotheses	Confirmatory Concerned with hypothesis testing & theory verification. Tends to follow positivist, quantitative modes of research
Induction Begins with specific instances which are used to arrive at overall generalisations which can be expected on the balance of probability. New evidence may cause conclusions to be revised. Criticised by many philosophers of science, but plays an important role in theory/hypothesis conception.	Deduction Uses general results to ascribe properties to specific instances. An argument is valid if it is impossible for the conclusions to be false if the premises are true. Associated with theory verification/falsification & hypothesis testing
Field Emphasis on realism of context in natural situation, but precision in control of variables & behaviour measurement cannot be achieved	Laboratory Precise measurement & control of variables, but at expense of naturalness of situation, since real-world intensity & variation may not be achievable
Idiographic Individual-centred perspective which uses naturalistic contexts & qualitative methods to recognise unique experience of the subject	Nomothetic Group-centred perspective using controlled environments & quantitative methods to establish general laws
AXIOLOGICAL LEVEL	
Relevance External validity of actual research question & its relevance to practice is emphasised, rather than constraining the focus to that researchable by 'rigorous' methods	Rigour Research characterised by hypothetico-deductive testing according to the positivist paradigm, with emphasis on internal validity through tight experimental control and quantitative techniques

Table 4.1 illustrates the realist/relativist, objectivist/subjectivist dichotomies, arguably considered irreconcilable and which have made paradigm wars to persist in scholarly research (Fitzgerald & Howcroft, 1998). Such dichotomies have made some researchers to grow weary as a result of the rhetoric, disaffection and the seeming irreconcilability of paradigms. It is no longer fashionable to be labelled a positivist or interpretive researcher (Weber (2004, p. ix). The author counsels that it is time to move beyond labels and to see the underlying unity in what researchers are attempting to achieve through their research methods.

As Bradley (1993, p. 443) argues, assumptions are neither proof-resistant nor immune to refutation. Therefore the choice of interpretivism as the research philosophy for this study does not in any way imply or allude to the inferiority of other research philosophies (Fitzgerald & Howcroft, 1998; Walsham, 2006). The choice of the ontology of relativism and the epistemology of interpretivism is informed by the methodological pluralist nature of EDTM as the research strategy for this study (Gladwin, 1989d). EDTM employs ethnographic research approaches such as intensive interviews and direct and participant observations to elicit the decision-maker's choice criteria (Gladwin, 1989b). This is unlike the neoclassical economists who use economic factors in order to optimize gains and minimize losses or the Marxist theorists who examine "relations of power and domination to extract decision criteria" (Gladwin 1979b, p. 658). Decision making is a cognitive process that occurs in the 'black box' of human mind and therefore any decision modeling tool should recognize the role of the person's cognition, failing which the proposed model risks becoming a "machine with its insides missing" (Quinn 1975, p. 28). Although some decision criteria are part of the unconscious pre-attentive and rapid processing, the criteria selected should meet two conditions. They should be expressed using the insider's emic categories and also be able to split the sample of informants into adopters and non-adopters (Gladwin, 1989a).

The predictive power of decision criteria in a natural decision process derives from the elicited perspectives of the informants while taking into account the deficiencies and capabilities of human cognition (Gladwin, 1979). While EDTM will be more elaborately covered in later sections of this chapter when addressing the research strategy issues, suffice

it to state here, that the EDTM methodology requires a research project to be conducted in two sequential phases (Gladwin, 1989a).

4.2.3 Aligning Empirical Choices with Research Philosophy

A methodology or an ‘empirical approach’ to a study answers the question: ‘*how can we find what we are looking for?*’ (Guba & Lincoln, 1994; Thomas, 2009). The pluralist philosophical stance in a sense, conveys the connotation of ‘the paradigm of choices’ (Patton, 2002), as it emerged out of the argument that certain research programmes contained phenomena that seemingly cut across both positivist and interpretivist paradigms thus violating strict philosophical monisms (Borrego et al., 2009; Harrits, 2011; Shaw et al., 2010). Methodological pluralism was proposed to address the research conflicts occasioned by the positivist-interpretivist, qualitative-quantitative, objectivist-subjectivist, realist-relativist, exploratory-confirmatory, as well as the idiographic-nomothetic dichotomies that have characterised the paradigm wars in the past few decades (Fitzgerald & Howcroft, 1998). Proponents of methodological pluralism admit that such an approach may be accommodated by a study in which the researcher adopts strict ontological and or epistemological monism in a way that helps the social scientist to overcome the challenges of paradigmatic incommensurability (Firestone, 1990; Iivari, 1991; Landry & Banville, 1992; McGrath, 1984).

The pluralist methodologists contend that there is no single scientific research approach that reigns supreme as the only correct one and that methodological choices should be made based on the research phenomenon and the research question (Hashemi, 2012; Wildemuth, 1993). And as elsewhere argued “the legitimacy, appropriateness and validity of any research methodology” derives from the research phenomenon, objectives and questions (Bradley, 1993). Thus, the pursuit of objectivity and empirical regularities on a platform of causal relationship makes the post-positivist research paradigm incapable of dealing with the informants’ meanings said to be critical in ethnographic interviews and observation phase of EDTM (Myers, 2009; Spradley, 1979).

EDTM methodology blends two sequential research phases namely, an initial qualitative phase which is ethnographically cyclic, followed by a linear hypothesis-testing phase (Gladwin, 1989a). The initial phase of EDTM is qualitative since the findings that constitute the decision criteria of the research informants are established through ethnographic research methods rather than through statistical procedures or other quantification techniques (Corbin & Strauss, 1990). As such EDTM methodology takes the form of a mixed-method approach that cannot holistically fit in any one research paradigm (Caracelli & Greene, 1997). Given the broad use of classical, basic classical and non-classical data elicitation methods of ethnography in the first phase, the ontology of relativism is presumably considered more appropriate because of its belief in ‘multiple realities that exist as subjective constructions of the mind’ whose variation may be triggered by varying contextual factors (Boyle, 1994; Whitehead, 2004; Dey, Newman, & Prendergast, 2010).

Ontologically, relativist scholars largely assume that the perception of reality is determined by socially-transmitted terms that vary across different languages and cultures (Ngwenyama & Lee, 1997; Walsham, 2006). Epistemologically, relativism denounces the separation of the knower from the research context (Geertz, 1973; Whitehead, 2004). Instead, relativism assigns a high premium on the researcher’s interaction with data subjects in context whose realism is considered critical, while arguing that there is no universal truth and therefore the local meanings gleaned from the informants have to be subjected to the knower’s “Frame of reference” for interpretation (Fitzgerald & Howcroft, 1998, p. 10), or what is elsewhere referred to as the inquirer’s etic perspective (Whitehead, 2005).

EDTM’s initial qualitative phase is inductively executed in line with the tenets of ethnographic fieldwork approaches which bar cognitive anthropologists from imposing their conceptual framework and or etic categories to the social-cultural context of the study (Kahneman & Tversky, 1982; Myers, 1999). The second phase follows a deductive approach in which the EDTM inquirer validates the descriptive ethnographic decision tree model using a survey design to test the decision criteria-based propositions obtained from the ethnographic phase (Beck, 2005; Edmonds, 2010; Gladwin, 1989a; Murray-Prior, 1998). The two phases of EDTM use different samples (one purposive and one representative) from which qualitative

and quantitative data are collected for the purpose of constructing and validating an ethnographic decision tree model (Gladwin, 1989a). Thus EDTM as a research methodology is anchored on a mixed-method research design which explicates the reason why this thesis study adopts a methodological-pluralist orientation across the two sequential research phases of EDTM (Creswell et al., 2008; Gladwin, 1989d). As such, this thesis study employs a scientific philosophy that permits a trans-paradigmatic approach at least at the methodological and axiological levels (Firestone, 1990), or a stance that would permit coexistence of epistemological monism with methodological pluralism (Iivari, 1991). Consequently this thesis research is underpinned by the scientific philosophy of interpretivism, which according to Mingers (2004) permits the use of qualitative and quantitative methods that have complementary potentials. An IS research agenda driven by one or two main paradigms on a platform of diversity is elsewhere envisaged (Benbasat & Weber, 1996).

While contributing to the decades-old IS research paradigm debate, Landry & Banville (1992) categorises IS researchers into three groups namely, the positivism-inclined '*mainstream navigators*'; the '*knights of change*' also called interpretivists or methodological-pluralists; and the '*unity advocates*' or seekers of the seemingly elusive super-method perceived by its champions as capable of unifying IS researchers (Pfeffer, 1993). Landry & Banville (1992) are however quick to dismiss methodological monisms as untenable for the IS research domain, while advocating for what they refer to as "a disciplined methodological pluralism" in a clear refutation of the supremacists' and isolationists' philosophical stances. The IS discipline is more pluralistic today and therefore accommodates diverse research methods, problems, paradigms and theoretical lenses. Benbasat & Weber (1996) however, quickly caution IS researchers to always ascertain that the two-point criteria for rigour and relevance characterize their studies so that diversity though useful does not become "the miasma that spells the demise of the IS research domain" (p. 397). Elsewhere, a monistic, Khunian view of IS research has been described as inadequate (Landry & Banville, 1989; Benbasat & Weber, 1996). The possibility of having epistemological monism co-exist with methodological pluralism has also been advanced in the IS research in a clear rebuttal to those who proscribe multi-method IS studies on the grounds of supposedly irreconcilable

ontological and epistemological dichotomies (Tashakkori & Teddlie, 1998; Teddlie & Tashakkori, 2008).

The possibility of paradigmatic commensurability has been suggested. For instance Lee (1994) proposes an ontologically and epistemologically integrative framework to combine ‘subjective understanding’ (the informants’ meanings), ‘interpretive understanding’ (the researcher’s cognitive understanding of the informants gained through anthropological and sociological participant or direct observation of subjects), and ‘positivist understanding’ (knowledge gained through empirical testing and mathematical measurement of formal propositions based on rules of formal logic). In particular, while refuting the view that interpretivism and positivism are mutually exclusive and irreconcilable, Lee (1994, p. 147) further posits, “interpretivism is neither better nor worse than positivism” adding that it only offers a scholarly knowledge that is qualitatively different from that offered by positivism with the implication that the two research approaches could mutually benefit and reinforce each other. Therefore the two paradigmatic orientations should be viewed as complementary and as of equal status, contends Walsham (1995) in his paper titled “The Emergence of Interpretivism in IS Research”. Moreover Mingers (2001, p. 241) while basing his arguments on what he calls “critical pluralism” argues in favour of combining trans-paradigmatic research methods that illuminate diverse aspects of a research problem in order to yield a deeper understanding. Although interpretive and positivist research approaches take different views of the nature of reality and how to know about or understand it, both approaches may be effectively combined (Wildemuth 1993, p. 466).

Elsewhere, methodological pluralism as Mingers (2001) argues is a viable and tenable research approach when seen in light of the three different worldviews to which different research methods relate. These worldviews as cited and paraphrased from Mingers (2001, p. 245) and Habermas (1984) are,

- (1) *The material world*. Seen as outside and independent of the observer and therefore objective and to which humans relate through observation rather than through participation or experience. Our observation and description of the material world is thus theory and concept dependent. The material world contains processes of evolutions that

yield linguistically endowed humans who are capable of communication and self-reflection.

- (2) *The personal world.* That is, the subjective world of individual human thoughts, emotions, experiences and beliefs. People experience rather than observe their personal world and are therefore capable of expressing their subjectivity to other people. For instance an informant can express his or her subjectivity to the ethnographic knower (Agar, 1996).
- (3) *The social world.* This is the world which members of a particular social system share and participate in. Members' relationship to their social world is one of inter-subjectivity because it is socially constructed and goes on to pre-exist any particular individual. Power relations are seen as a key definer of the social world which is thus viewed as complex multi-layering of language, meaning, social practices, rules and resources that enable and constrain participants' actions and is reproduced through them (Giddens, 1984; J. Mingers, 2004).

Adopting a particular research paradigm is comparable to viewing the world through a specific instrument such as a telescope, an X-ray machine, or an electron microscope where each reveals certain aspects but is blind to others. The instruments may be pointing to the same object, but they produce different, and seemingly incompatible images (Mingers 2001, p. 244). Therefore, each method, only gives a limited view of a particular research context such that the measurable, quantifiable aspects may be revealed while individuals' subjective meanings that embody the intangible social-cultural norms and political context remain hidden. Research paradigms are constructs of human cognition and no single paradigm can fully explicate the complexity of the world around us. Adopting such an approach may lead the error of 'epistemic fallacy' which limits what may exist to the current human knowledge, or to the error of 'anthropic fallacy' where 'existence' is erroneously defined only in relation to human being (Bhaskar, 1978; Mingers, 2004).

Many champions of multi-method and mixed method research approach bemoan the lack of coverage of methodological pluralism in current IS literature (Galliers, 1993; Klein & Lyytinen, 1985; Lee, 1991; Tashakkori & Teddlie, 1998). Gioia & Pitre (1990) strongly

contest the notion of paradigmatic incommensurability and dismiss as erroneous the characterisation of paradigms as separate and mutually exclusive platforms. The authors note that in the contrary it is possible to create bridges across the seemingly impenetrable boundaries of existing paradigms because they have ‘permeable edges’ that may act as interaction zones. Additionally, the tendency to see research methods as belonging to a particular method has been faulted by some IS researchers who postulate that the use of quantitative data need not be construed as an acceptance of a positivist, objectivist epistemological stance since such data could also be interpreted in light of contextual social meanings and that their production should be seen as a social construction process (Mingers, 2001). Instead IS researchers should have the freedom to select and use appropriate and perhaps even different research methods depending on the activities and objectives predominating a particular stage of a study process which should not be construed as a discrete event (Mingers, 2004).

Like Mingers (2001) who roots for the adoption of critical pluralism at different philosophical and methodological levels, other IS researchers have investigated and defended the use of mixed-method research designs (Hanson et al. 2005; Nastasi et al. 2007; Creswell et al. 2008; Hashemi, 2012). The mixed-method research designs have been classified as either ‘concurrent’ in which qualitative and quantitative research occur concurrently, or ‘sequential’ in which qualitative and quantitative designs are executed sequentially (Hashemi, 2012, p. 207). Creswell et al. (2008: 67–70) further classifies the concurrent and sequential designs into:

- 1) ‘*Concurrent triangulation design*’, in which quantitative and qualitative data are collected and analysed in parallel and interpretations are drawn based on quantitative-qualitative results);
- 2) ‘*Concurrent embedded design*’, where qualitative data are collected within the quantitative design between pre-tests and post-tests, and interpretations are based on both quantitative and qualitative data).
- 3) ‘*Sequential explanatory design*’, where quantitative data are initially collected and analysed, followed by collection and analysis of qualitative data to further explicate the

initial quantitative findings with final interpretations being based on quantitative-qualitative data.

- 4) '*Sequential exploratory design*', a design where qualitative data are first collected and analysed after which quantitative data are collected and analysed to further examine the phenomenon, with final interpretations being based on both qualitative and quantitative data.
- 5) '*Sequential embedded design*', in which qualitative data is collected before the beginning or completion of an intervention with interpretations being made on the basis of data integration (Creswell et al. 2008, p. 67-68).

EDTM may therefore be classified as a sequentially exploratory design according to Creswell et al.'s (2008) mixed-method taxonomy.

4.3 Research Strategy: Ethnographic Decision Tree Modeling (EDTM)

The choice of EDTM as a research strategy is informed by the nature of the phenomenon under investigation, which requires combining multi-paradigm methods with complementary interpretivist and positivist strengths (Firestone, 1990). Although EDTM uses the research techniques drawn from ethnography that is, ethnographic interviews and participant observations, it is not ethnography itself. EDTM has been employed in the study of such phenomena as entrepreneurial aspects of telecenters (Bailey & Ngwenyama, 2013) and student blogging behaviour (Andergassen et al., 2009). Ethnographic approach has been used to evaluate ICT phenomena (Dey, Newman, & Prendergast, 2010). Some researchers have contended that the design of a human development project may be improved through effective elicitation of the cognitive strategies underlying the uptake decisions of the target adopters (Gladwin, 1979a; Sen, 1998; Hamel, 2010). Cognitive strategies influence people's adoption and non-adoption decisions relating to a technology and therefore an understanding of cognitive processes of the people involved creates opportunity for stakeholders to effect a policy intervention ex poste or modify the project design ex ante (Beck, 2005; Davenport, 2007). Ex poste policy intervention are based on known results rather than on forecasts while ex ante policy intervention means are based on forecasts or projections since no research findings are yet available (Edmonds, 2010). The use of a hierarchical decision tree to

ethnographically model human decisions enables the stakeholders to see an ICT4D initiative through the eyes of the potential adopters or non-adopters (Bailey & Ngwenyama, 2013). Additionally, EDTM can be employed either *ex ante* or *ex post* depending on the implementation stage of the project and whether the goal is evaluative or design-related (Gladwin & Barlett, 1980). The next couple of sections describe EDTM in detail, highlight its assumptions, outline the procedure for its practical application in IS research and provide a graphical representation of its execution.

4.3.1 The Background of Ethnographic Decision Tree Modeling (EDTM)

The origins of EDTM can be traced back to an evaluation research conducted by Christina Gladwin on the Plan Puebla Project in Mexico (Gladwin, 1976). Plan Puebla is touted as one of the great Green Revolution initiatives of the 1960s and 1970s that included the Comilla Project in Bangladesh, India's Intensive Agricultural District Program (IADP), Colombia's Caqueza Project, Tetu Project in Kenya and Ethiopia's Minimum Package Program (MPP) (Gladwin, 1979). The objective of these evaluative studies was to identify the design requirements necessary to guarantee the success of a development project (Gladwin, 1977). Gladwin's evaluation is comparable to that conducted by diffusion theorists who seek to identify the determinants of ICT adoption (Koku, 2009; Rhine & Greene, 2006; Rogers, 2003). For the purpose of clarity, the Plan Puebla project upon which EDTM was formulated over two decades in 1970s and 1980s is an agricultural development initiative started in 1967 by Mexico's International Centre for the Improvement of maize and wheat (Gladwin, 1979). The centre, which in Mexican local language is called the '*Centro Internacional de Mejoramiento de Maiz y Trigo*' (CIMMYT), is currently run by the Graduate College of Agriculture at Chapingo, Mexico. Plan Puebla project's initial objective was to develop hybrid maize varieties that would yield more than *criollo*, the Mexican local maize variety. Unfortunately, the search efforts for a superior variety failed and the project stakeholders instead compiled four recommendations between 1973 and 1974 namely: (i) Provide credit for fertilizer to target farmers, (ii) Increase plant population to a higher crop density, (iii) Increase the number of fertilizer applications and change the application timings, and (iv) use a new recommended amount of fertilizer per hectare (Gladwin, 1977).

Gladwin sought to investigate why the target farmers failed to adopt a seemingly good recommendation with a view to uncover and explicate possible reasons why the Plan Puebla project designers might have come up with a recommendation that was unappealing to the proposed adopters (Gladwin, 1976). To explain the non-adoption paradox, Gladwin (1979a) argues that the project planners failed to take into account the fact that the adoption decisions of the target farmers were informed and shaped by the cognitive strategies which they were using in maize production. The American Psychological Association (APA) defines ‘cognitive processes’ as ‘the higher mental processes such as perception, memory, language, problem solving, and abstract thinking’.

EDTM is rooted in cognitive psychology, the discipline concerned with the study of thoughts and mental processes that underlie human behavior (Kahneman, 2003). Thus, modeling ‘adoption’ as a ‘decision’ made by the informant farmers, argues Gladwin (1979a), conferred an opportunity to see the overall development initiative through the eyes of the proposed adopters. To lay the foundation of what later became the ethnographic decision tree modeling (EDTM), Gladwin (1989a) offers both a theory about how people make decisions in a naturalistic setting and a methodology to aid the empirical investigation of natural decisions. This led to the development of EDTM as a methodology for studying naturalistic decision making processes which is underpinned by *the theory of real-life choice* (Gladwin & Barlett, 1980).

4.3.2 Methodological Triangulation in EDTM

Triangulation has been defined as “*the combination of methodologies in the study of the same phenomena*” and as “*the convergence of research methods for more objective and better results*” (Denzin 1978, p. 294-307). EDTM achieves methodological triangulation by combining an interpretive ethnographic phase of building a descriptive decision model, with a straight-line hypothesis phase where the deliverable of the interpretive phase is tested for predictability (Gladwin, 1989a; 1989b). As a simplified representation of the real world, a decision tree model is created by speculating about the processes underlying the observed facts and then evaluated in terms of its ability to accurately predict other new facts (Lave &

March, 1975, p. 19). The next section describes how people in a natural context ‘covertly’ make use of hierarchical decision models envisaged by the theory of real-life choice.

4.3.3 Ethnography Elaborated

The long-ranging quantitative-qualitative debate in the social sciences over the last couple of decades has on one hand, positively led to the acceptance of qualitative methods as reliable and effective research methods in their own right (Fitzgerald & Howcroft, 1998; Myers, 1999; Walsham, 2006) while on the other hand, the dichotomous debate has negatively created the misconception that ethnography is just another qualitative research method (Boyle, 1994). Although ethnography has been predominated by qualitative methods paradigm, Whitehead (2004) argues that anthropologists have nonetheless used quantitative approaches as well as other classical and non-classical methods depending on their research setting and the phenomena under investigation, adding that this trans-paradigmatic borrowing of methods with complementary strengths could help mitigate the limitations inherent in each approach.

Ethnography is empirically rooted in anthropological studies and its goal is ‘to see the insider’s world through the insider’s eyes’ (Dey, Newman, & Prendergast, 2010). Ethnography helps to overcome the temptation to regard some of the aspects underlying an informant’s choice as irrelevant especially in situations where familiar routines are commonplace to the scientific observer (Kahneman & Tversky, 1982). Traditionally economists use formal methods to examine macro-level phenomena in a large area as opposed to anthropologists who use ethnographic discovery process to study and model micro-level cultural and socio-economic phenomena in smaller contexts (Gladwin, 1989b). Arguably, ethnographic research approach is more time-consuming and empirically different from the linear sequence of hypothesis testing common in neo-classical and Marxist economics (Boyle, 1994; Myers, 1999). Malinowski & Frazer (1922) posit,

“In ethnography, the writer is his own chronicler and the historian at the same time, while his sources are no doubt easily accessible but also

supremely elusive and complex; they are not embodied in fixed material documents but in the behaviour and in the memory of living men” (p. 4).

The ethnographer has to traverse the laborious stretch “between the brute material information as it is presented to the student in his own observations in native statement, in the kaleidoscope of tribal life – and the final authoritative presentation of the result” (Malinowski & Frazer, 1922, p. 4). Whitehead (2005) follows Spradley (1979) and suggests a list of attributes on which he places a caveat as being inexhaustive but which according to the author define the tenets of ethnography in a way that would enable anthropologists and ethnographers to freely choose appropriate methods for their research settings. Table 4.2 outlines and describes each of those attributes perceived as definers of ethnography.

Table 4.2 Perceived Attributes of Ethnography (Whitehead, 2005)

	Attribute/Definer: Ethnography is conceptualised as:	Description and Significance of Attribute
1.	A holistic approach to the study of cultural systems	<p>This implies a broad-focused research that in Whitehead’s (2005, p. 6) perspective, conceptualises, ‘culture’ as a holistic, flexible, non-constant system made up of culture bearers’ (i) ideational systems that include knowledge, beliefs, attitudes, values and mental dispositions); (ii) preferred behaviours or normative systems and, (iii) structural or social relationships.</p> <p>Unlike positivist approach which begins with predetermined hypotheses to be confirmed or disconfirmed as objective reality, ethnography begins with an open-ended exploratory effort to unearth the complex and multi-faceted multiple realities (Myers, 1999).</p>
2.	The study of the socio-cultural contexts, processes, and meanings within cultural systems	<p>Ethnographer’s focuses on: 1) Social-cultural contexts such as households and families, formal and informal networks, organisations, groups, institutions and their relationships with the broader society, their significant social systems (Whitehead, 2004), inter-society linkages etcetera all of which imply an on-going human activity; 2) Social-cultural processes include those inherent in interactions of individuals within their social systems, with as well as within physical environments, shared histories, and in activities designed to satisfy human needs; 3) Social-cultural meanings assigned by culture-</p>

		bearers to their relationships, physical contexts, individual and shared historical events, patterns of human needs satisfaction, e.g. Safety and security programmes (Whitehead, 2004). This makes ' <i>fieldwork</i> ' a critical component of ethnography to achieve high emic validity through inter-subjective interactions with, and observing, interviewing and participating in informant's activities (Denzin, 1978).
3.	The study of cultural systems from both emic and etic perspectives	<p>The ethnographer maintains both emic and etic perspectives in the course of inquiring into the informants' cultural systems (Whitehead, 2005). Etic knowledge on the part of ethnographer helps to distil what is truly emic or native perspective. The goal is to achieve emic validity in a research context with multiple realities contained in both tacit and ideal cultural phenomena (Berry, 1989; Morey & Luthans, 1984; Whitehead, 2005).</p> <p>Unlike 'etic data' which is observer oriented, 'Emic data' is more culturally tuned and is therefore collected by using techniques such as ethnographic interviews and participant observation which enable the ethnographer to 'see the insiders' world through the insiders' eyes' (Malinowski, & Frazer 1922; Warner, 1999).</p>
4.	A process of discovery, making inferences, and continuing inquiries in an attempt to achieve emic validity.	The cyclic character of ethnography is necessitated by the possibility that emergence of hidden cultural phenomena may be triggered by the "disjunction between worlds" that is, the ethnographer's assumed understanding is violated and requires resolution through additional fieldwork to regain coherence (Agar, 1996). Whitehead (2005, p. 6) posits " <i>the process of breakdown-resolution-coherence accentuates the importance</i> " (p. 6)
5.	An iterative process of learning episodes	An ethnographer gets immersed into the research context with the aim of discovering knowledge iteratively and discursively, that is, successive knowledge builds on previously acquired knowledge hence the notion of learning episodes that may require use of varying research methods and data collection techniques (Myers, 1999).
6.	An open-ended emergent learning process, and not a rigid investigator controlled experiment	<p>Ethnographic knowledge discovery is facilitated by the iterative processes of fieldwork including episodic interviews, non-participation and participant observations where informants are treated as experts of their own culture best placed to tell the story (Myers & Young, 1997).</p> <p>Being open-ended and emergent, ethnography makes a departure from the methodological rigidity inherent in positivist orientation paradigm, and accords ethnographers</p>

		and anthropologists the ontological, epistemological and methodological flexibility and creativity in the selection and continuous use of a broad range of qualitative and quantitative, basic classical, classical and non-classical research methods until the greatest emic validity possible is achieved (Whitehead, 2005, p. 6-7).
7.	A highly flexible and creative process	The inability of the ethnographer to exert investigator control over the research context calls for high levels of creativity to earn and sustain the informants' goodwill and cooperation and also to sustain the rapport built to the end of the research project (Denzin & Lincoln, 1994; Whitehead, 2004).
8.	An interpretive, reflexive, and constructivist process	While following Mingers (2001) and Altheid & Jonhson (1994), Whitehead (2005) contends that all research findings are interpretations of the inquirer adding that, since ethnography does not follow the rigid statistical treatment of investigator's etic variables, reflexivity provides an ideal approach to achieving interpretative validity (Myers, 1999). Reflexivity considers the scientific researcher as part and parcel of the research context and the cultural system he or she is trying to investigate, understand and represent, a stance which necessitates an on-going review of possible causes of biases in researcher's interpretations and perceptions (Altheide & Johnson, 1996). In addition, ethnographic constructivism views "realities" as value-laden rather than value-neutral phenomena jointly built out of the investigator's observations and informants' input (Walsham, 2006).
9.	Requires the daily and continuous recording of field notes.	Maintaining a field journal, or record of field notes is considered a salient feature of ethnographic research approaches because of their open-ended emergent learning nature (Myers & Young, 1997). Field notes facilitate the capture of key pieces of data when still fresh and support the subsequent pattern and thematic analysis (Brown, 2005). The field journal also enhances and mitigates the limitations of the human mind and supports the interpretive and iterative episodes in ethnography (Myers, 1999).
10.	Presents the world of its host cultural system using rich, thick descriptions	Thick ethnographic descriptions have the potential to provide rich information about a research context (Myers, 1999).

From the foregoing discussion ethnographers are open to a variety of research methods including those that lean more towards quantitative positivist epistemologies. For instance,

Whitehead (2005, p.7) while following Denzin & Lincoln (1994, P. 2) who describe the effective ethnographer as a 'bricoleur' or a 'jack of all trades', contends that ethnography should not be enslaved to any single research method. Research may be classified using either the qualitative-quantitative methodological orientation or by using ontological-epistemological orientation (Guba & Lincoln, 1994). A differentiation of philosophical orientation that goes beyond mere discussion of methods is however preferable (Whitehead, 2005). Although ethnography shares most of the ontological, epistemological and methodological orientations of qualitative methodologists, it also shares some with quantitative investigators and accommodates other orientations absent in the qualitative-quantitative dichotomy (Fitzgerald & Howcroft, 1998). The attributes in table 4.2 also give a strong indication that ethnography is more than just simply another qualitative research method that incorporates ontological, epistemological and methodological aspects (Whitehead, 2004).

Cultural expressions may exist as real for its practitioners, or may represent simply an ideal of what the culture bearers would like something to be (Whitehead, 2005). Cultural expressions may also exist as explicit or tacit culture where the latter type is seen as being responsible for the contradictions between what is spoken and what is done (Kroeber et al., 1952; Myers, 1999). Thus interviews may not be adequate and therefore require to be augmented by observations. That is, over and above asking 'What is going on here?', Whitehead (2005) and Spradley (1979) argue that the ethnographer should employ 'natural enquiries' namely, the 'Who, How, Where, When and Why' in order to capture phenomena for observation such as actors and their characteristics; behaviours (acts, activities, observations); space occupied and actors; situated objects and how they are arranged); timing of observations such as when the transaction is made; goals associated with behaviours of actors including their motivations and agendas; emotions or feelings exhibited and associated behaviours; language or expressive culture of informants; interactive patterns; discourse content thought to influence the actors' behaviour as well as the presence of actor groups that are differentiable by sex, age, kinship, vocation or other type of affiliations (Harris, 1979).

Therefore, ethnography shares the relativists' ontological view of 'multiple realities' existing as 'subjective constructions of the mind' that vary with environmental factors, and also the interpretivists' epistemological inclinations to the notion of knowledge and findings being a product of inter-subjective interactions between a researcher and the informants (Whitehead, 2004). Ethnography is thus a trans-paradigmatic research methodology whose ontological-epistemological orientation underpins EDTM, the research methodology used in this study (Oats, 2005). Like ethnography, EDTM incorporates the use of quantifiable aspects (Beck, 2005). However, unlike the quantitative methods such as confirmatory factor analysis, multidimensional scaling and cluster analysis, EDTM is not a 'black-box' technique for testing the researcher's own interpretations of the insider's culture (Gladwin, 1989a; Gladwin, 1979). Rather, 'it is a way to build a predictive model of the insiders' decision processes from the natives' own terms and phrasing of their decision criteria. EDTM is therefore a strongly context-sensitive research activity (Bailey & Ngwenyama, 2013).

4.3.4 Contrasting EDTM with Traditional Quantitative Decision Models

In making real-life decisions in a social-cultural setting, human beings do not normally holistically assign utility to each alternative and then choose the alternative with the highest utility based on carefully computed probabilities (Gladwin & Murtaugh, 1980; Quinn, 1971). Naturally decision makers usually just choose one of several alternatives without having to rank them up (Fjellman, 1976; Gladwin, 1989a). Most real-life decisions are made in a decomposed fashion using relativistic comparisons and evaluations of multidimensional alternatives are seldom holistic in the sense of each choice being assigned a separate utility value. Rather people compare and contrast the preconditions on a piecemeal basis (Shoemaker, 1982). As such, a decision model becomes a 'precondition function' not built from carefully ordered alternatives (Arrow, 1951). Without models such as decision trees, argue Lave & March (1975), it would be difficult to make sense of the intricate reality in social and behavioural sciences. Models are metaphors that simplify complex phenomena in social science research and aid the understanding of the human behaviour and its complexity (Lave & March, 1975).

Ethnographic decision tree models are based on realistic assumptions about an ordinary person's cognitive capabilities and are thus testable. Instead of using what Gladwin (1989a) calls 'armchair propositions' and none-real behavioural assumptions, EDTM employs ethnographic fieldwork techniques to elicit decision criteria (empirical data) from decision makers themselves. Unlike EDTM, quantitative linear-additive models such as linear programming models, expected-value and expected-utility models, and stochastic dominance models are not validated against a set of choice data to see how well they can predict the decision criteria of an individual in the group under study (Shoemaker, 1982; Gladwin, 1989d). As such, these methods are not empirically grounded and hence cannot be cognitively realistic models of the decision choice (Gladwin, 1989a). Although probit and logit models (probability unit and linear regression analyses) can be validated using data on choices made by a group of people, they are not cognitively-realistic models of the choice-process since as Quinn (1971) noted, decision-makers in real-life rarely assign weights to multiple variables and then sum them up to determine the best choice among them. In contrast EDTM is both a participatory and cognitive research method that enables empirical capturing of the "idiosyncratic attitudes as well as the unpredictable behaviour" of natural decision makers that is often beyond the reach of quantification and statistics emphasized in microeconomic theory (Gladwin, Peterson, & Mwale, 2002).

4.3.5 Achieving Objectivity in EDTM

A key characteristic of EDTM is that the inquirer tests the model by using it to predict the choices made by an entirely new, independent and possibly representative sample of decision makers. The notions of 'newness' and 'independence' in the testing phase have the implication that the informants involved in testing the model did not participate in its construction (Gladwin, 1979). As such EDTM is deemed to minimise the researcher and informant subjectivity in order to achieve what positivist theorists pursue by seeking to detach the knower from a research context to possible biases and maximise the objectivity and reliability of the results (Fitzgerald & Howcroft, 1998).

4.3.6 EDTM Execution Process: A Pictorial Representation

As illustrated in the figure 4.1, the ethnographer selects a research topic at the iterative phase, and begins to conduct ethnographic interviews and field observations as he or she writes field notes on a field journal (Spradley, 1980). The journal is then analysed in order to discover ‘better questions’ to ask in the second interview cycle. During the second loop, the ethnographer uses the ‘native’ language categories, (learned in first iteration) to ask ‘better questions’ and presumably gets better answers so as to formulate even better questions to ask in the third round (Gladwin, 1989a). The research then enters the next and final phase of linear hypothesis-testing sequence. In this phase, the EDT model to be tested is formulated; a research instrument is designed (choose a sampling strategy and design a research survey); collect choice data to validate the model; analyse choice data, draw conclusions and report on the tested model (Gladwin, 1989a). Tashakkori & Teddlie (1998) in particular contend that combining research methods in one research programme could yield benefits such as 1) triangulation (where data and results are validated using diverse sources, methods and possibly researchers, 2) creativity by which paradoxical concepts are unearthed thus triggering further examination, and 3) broadening of the research scope to investigate more aspects. Mingers (2001, p. 252) while underscoring the potential benefits of combining research methods, also tabulates multi-method designs that include sequential, parallel, multi-methodology, dominant/imperialist and multi-level designs. Whereas the specific practical steps in EDTM methodology are outlined more elaborately in subsections 4.3.7 and 4.3.8, figure 4.1 outlines the sequential multi-method design of an EDTM research programme and graphically represents the two-phased empirical process that was followed by this study.

7th step: Construct a decision model from the individual decision criteria

8th step: Juxtapose all the different individual decision trees from all informants in the model-building sample, in a logical fashion that preserves the ethnographic validity of each informant decision model (Beck 2005; Gladwin 1989a, p. 21-39).

4.3.8 EDTM Phase 2: Model-Validation

The straight-line research phase takes the ‘group model’ yielded by cyclical-discovery process and tests it against choice data from individuals in the group to check if it predicts the behavior of individuals in the research group (Gladwin 1989a, p. 45-50). According to EDTM champions, validation process can be executed as outlined here below:

1st step: Design a formal questionnaire to test the composite model from phase one

2nd step: As with step 5 of model-building phase above, decide on a representative sample of decision makers with whom to validate the model.

3rd step: Elicit quantitative data about the decision outcome before participants are asked about the specific preconditions for their decision.

4th step: Take note when the model is having an error, e.g. when informant response fails to follow the pathway predicted in the composite model.

5th step: Calculate both the error and success rates

6th step: Modify the composite model if it predicts less than 85% of decisions of the test sample.

7th step: In the event that a low prediction leads to revision of the model, then test newly devised alternative model with the test sample data.

4.4 Data Collection Procedures

The study targeted MSMEs’ that have adopted and actually use mobile banking systems and non-adopting MSMEs within Nairobi and its environs owing to the higher levels of digital literacy in these areas. MSMEs operators provided qualitative data on their lived experiences as end-users of the mobile banking IT artifact. This EDTM study was designed to adhere to the basic criteria of (i), theoretical, methodological and data triangulation (ii) systematic

gathering of data (iii) and reliable recording and transcription of data to ensure validity of the empirical observations (Klein & Myers, 1999).

The goal of EDTM is to conduct an intensive research which is common in interpretive studies (Gladwin, 1989a). An EDTM researcher endeavours to see the phenomenon through the informants' eyes in order to extract their "emic" rather than "etic" categories and thus minimize his or her own ethnocentricity (Gladwin, 1989a; Warner, 1999). The term 'ethnographic' in EDTM methodology does not imply use of pure ethnography as explained in section 4.3.3 (Whitehead, 2004). EDTM is an empirical research methodology developed from the studies of anthropological decision-making (Gladwin & Murtaugh, 1980). For the purpose of disambiguating the meaning, the term 'ethnographic' according to Gladwin (1989a) conveys a sense of bringing the researcher into contact with the decision makers in their own social context, which in a sense takes issue with the positivist's emphasis on detaching the knower from the research field (Fitzgerald & Howcroft, 1998). The procedures used to collect data for this study are briefly discussed below.

4.4.1 Sampling

Below is a summary of the sampling techniques used at each of the stages and phases of the study.

(i) Initial Descriptive Survey: 45 respondents (Purposive Sampling)

The goal of this phase was to obtain the MSMEs' emic perspectives of mobile banking in their own context. A purposive sample of 45 respondents was constructed. Purposive sampling was used to ensure that only those informants with the requisite knowledge of mobile banking were interviewed (Bailey & Ngwenyama, 2013).

(ii) Initial Adoption Decision Model Building: 15 Respondents (Convenience Sampling)

The goal of this stage was to elicit the decision criteria evaluated by MSMEs when making the initial mobile banking adoption decisions (Table 5.9, Figure 5.12). As explained further ahead, ethnographic interviews were conducted on a convenience sample of 15 MSME informants during which the researcher closely monitored the emerging categories from one informant to another. When no new themes were seen to emerge, the decision criteria

elicitation process was deemed to have reached a saturation point and concluded (Davenport, 2007; Patton, 2002).

Therefore, to examine and model the mobile banking adoption decision, exploratory free-ranging ethnographic interviews and participant observations were conducted on a convenience sample of 15 MSMEs in Nairobi and Kiambu counties, out of which 5 MSMEs were drawn from the urban district, 5 from peri-urban areas and 5 MSMEs from the mid-rural setting after the peri-urban areas, to achieve data triangulation (Spradley, 1979; Whitehead, 2005). The sample comprised two subsets, with the first subset consisting of 10 MSMEs that used mobile banking service in business transactions and the second one having 5 MSMEs that did not use the technology. Informants were sampled for diversity across age, gender, education, network subscription, nature of business and location (Denzin & Lincoln, 2000; Ryan & Bernard, 2000). This sample structure is a necessary consideration in EDTM studies since it keeps the researcher from modeling based on the idiosyncratic decision criteria that only have capacity to predict a limited number of test cases (Gladwin, 1989a).

(iii) Initial Adoption Decision Model Testing: 31 Respondents (Stratified Sampling)

In order to test the initial adoption decision model, an independent stratified sample of 31 MSMEs was constructed. The respondents were asked to respond to questions in the model validation questionnaire in Appendix II. Stratified sampling was deemed appropriate because of the variations of the MSME population in terms of size, number of employees, urban versus peri-urban locations, nature of business, age and education levels of respondents.

(iv) Supplier Payment Decision Model Building and Customer Request Decision Model Building: 45 respondents (Purposive Sampling).

This phase of the study was conducted to elicit the decision criteria evaluated by MSMEs when deciding to use mobile banking to pay suppliers and when deciding whether or not to allow a customer to pay through mobile banking. The construction of the supplier payment decision model and the customer payment decision model was based on the decision criteria obtained from a heterogeneous, purposive sample of 45 MSMEs. Purposive sampling has been used by EDTM researchers to collect data from small samples of informants who are knowledgeable in the area under investigation (Ryan & Bernard, 2006; Newman, &

Prendergast, 2010). The purposive sample was constructed after a series of initial visits and telephonic calls with the owners and senior managers of the 45 MSMEs described in table 5.11. 22 MSMEs allowed some customers to pay through mobile banking while 23 did not. Besides, 20 MSMEs paid a few suppliers through mobile banking system while 25 MSMEs did not. Therefore the sample was adequate in modeling the two actual usage decisions and the sampling approach made it possible to simultaneously glean the decision criteria underpinning the two choices.

(v) Supplier Payment Decision Model Testing and Customer Request Decision Model Testing: 89 Respondents (Stratified Sampling).

To test the supplier payment decision and the customer payment decision models, an independent stratified sample of 89 MSMEs was constructed. The respondents were then asked to respond to the questions in the model validation questionnaire in Appendix II. Gladwin (1989) contends that a test sample may be small or big depending on the study's goals and the nature of the phenomenon.

4.4.2 Ethnographic Interviews

The goal of EDTM methodology is to determine the actual information used by the informants to make a particular decision (Gladwin, 1983). Ethnographic interviews are an effective data collection technique for the intensive purposive-sample based elicitation process (Spradley, 1979). An ethnographic interview like any other ordinary conversation is a speech event governed by the cultural rules that dictate the starting, closing, taking-turns to talk, asking of questions, taking a pause and issues of distance between involved parties (Spradley, 1979). As table 4.3 shows, an ethnographic interview differs from an ordinary conversation in terms of its seemingly greater formality evidenced by less balanced turn-taking, permissible repetition, expression of ignorance and probes triggered by the ethnographer (Spradley, 1979).

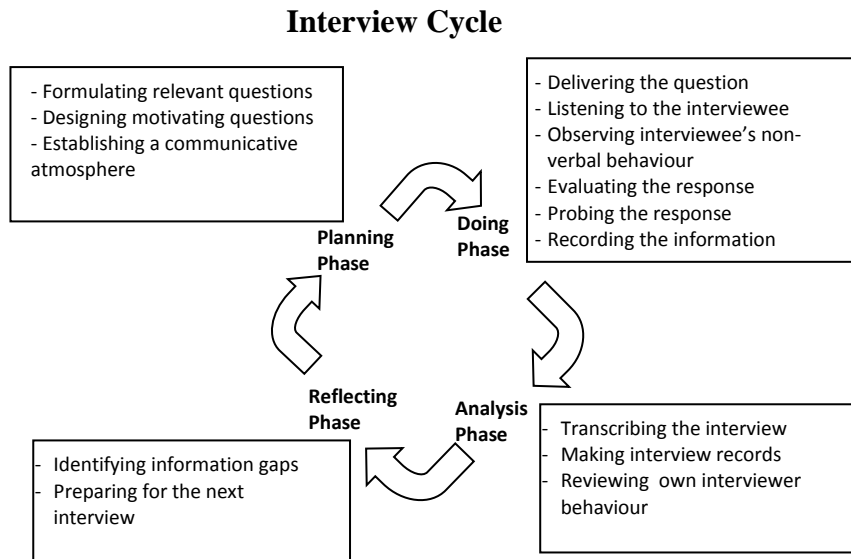
Table 4.3 Elements of an Ethnographic Interview (Spradley, 1979)

	Element	Description /Purpose
1	Greetings	Indicating the intention to talk
2	Giving ethnographic explanations 2.1 Giving project explanations 2.2 Giving question explanations 2.3 Giving recording explanation 2.4 Giving native language explanations 2.5 Giving interview explanations	To learn the cultural knowledge of the informant Explain the study's purpose in local terms Shed light on question type and purpose Seek informant's authorisation to write notes or use tape recorder Request informant to use his/her cultural terms and language since the goal is to describe the culture in local terms To enable the informant accept greater formality by knowing what to expect
3	Asking ethnographic questions 3.1 Asking descriptive questions 3.2 Asking structural questions 3.3 Asking contrast questions	To sample an informant's on-going language and terms To prompt the subject to explain or describe something To unearth kinds and sequences of activities, stages and Processes that is, how the domains or basic units of cultural knowledge are organised (Spradley 1979), e.g. What are the stages of registering for mobile banking? To discover 'meaning' of local terms used by informants e.g. asking the difference between two things
4	Asymmetrical turn taking	Ethnographer wisely takes control of the speech event
5	Expressing interest	To create and maintain rapport and cooperation
6	Expressing cultural ignorance	To make informant assume the role of a teacher and tell more
7	Repeating	To give or seek clarification without rude interruptions of the speech event
8	Restating informant's terms	To seek or confirm understanding of local terms
9	Incorporating informant's terms	To make the informant see that he or she is adding value
10	Creating hypothetical situations	To get relevant explanation from the subject
11	Asking friendly questions	To boost and sustain rapport and cooperation
12	Taking leave	Bringing the interview to a cordial closure

In addition, Spradley (1979) argues that, in order to guarantee the appropriateness of a strange culture-oriented question, the ingenuity of both the bilingual or bi-cultural consultant and the ethnographer is imperative. Conducting this study in the familiar Kenyan culture helped the investigator to mitigate the potential time constraint. In particular, knowledge of Swahili, Kenya's second official language came in handy since it is the language most commonly used in business transactions by MSMEs in Kenya. Figure 4.2 represents the Reysoo & Heldens (2007) model that was found useful in the conduct of the ethnographic interviews. The model conceptualises qualitative research as an iterative process in which data collection, data

recording, data analysis, reflections and generating new questions, are part of a continuous effort (Wolcott, 1994).

Figure 4.2 Qualitative Interview Cycle: Adapted and modified from (Reysoo & Heldens, 2007)



4.4.3 Design of Interview Questions

To facilitate the collection of data the *Interview Guide* provided in Appendix II was designed and used. The interview protocol questions were structured using:

- (i) The concepts of signification, domination, legitimation, unintended consequences, and time-space distanciation etc. drawn from the theory of structuration (Giddens, 1984). The resulting data yielded the descriptive statistics discussed in the data analysis section 5.2 of chapter 5.
- (ii) The concepts of 'bi-polar aspects', 'alternatives', 'decision criteria', and 'constraints', drawn from the real-life theory (Gladwin, 1989a) and from ethnographic lens of cultural systems paradigm (Whitehead, 2004) to collect data for the model-building and model-validation phases of EDTM. The resulting data yielded the three decision models presented in figures 5.12, 5.14 and 5.15.

4.4.4 Participant Observation

To supplement the interview data, participant observation was conducted at the MSME premises so as to capture the non-verbal cues of data subjects (Spradley, 1980). For instance, MSME operators were observed when interacting with the mobile banking application in the business premises and at the money transfer agents' stores. According to Walsham (2006) interviews ought to be supplemented by other forms of field data in an interpretive study including press, media, publications, web-based data internal documents such as strategic plans and evaluations as well as data obtained through participant observation of action and surveys. Patton (2002, p. 223) contends that *"there are no perfect research designs. There are always trade-offs. Limited resources, limited time, and limits on the human ability to grasp the complex nature of social reality necessitate trade-offs"*.

Therefore ethnographic fieldwork techniques, namely participant observation and ethnographic face-to-face interviews were the primary data collection methods used during the first phase of EDTM and were conducted on site, that is, at the business premises of the target MSMEs and mobile-money transfer agents, in an effort to collect the data from the informants in their own social context (Spradley, 1979; Spradley, 1980).

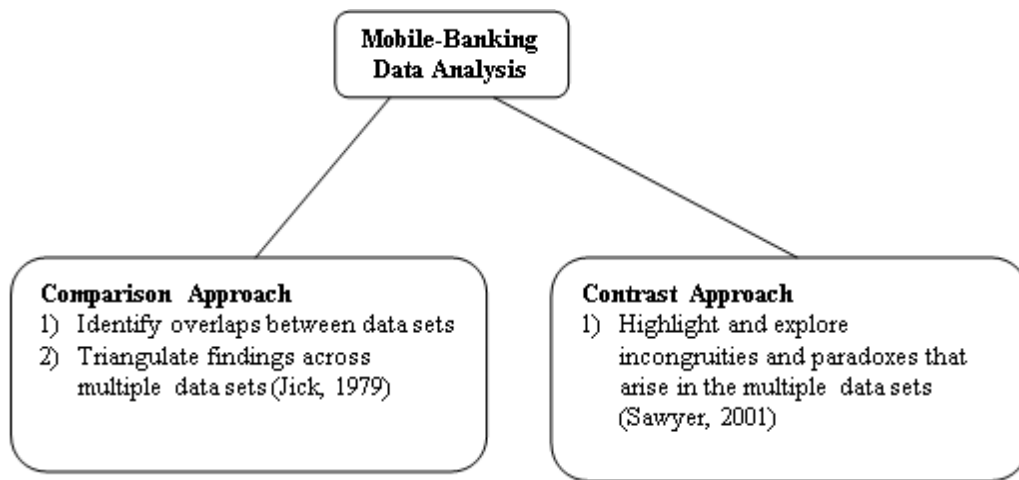
4.5 Data Analysis Procedures

Basic descriptive statistics and decision tree models were used to analyse the empirical data. SPSSx program was used to generate the basic descriptive statistics while comparison and contrast aided the derivation of the ethnographic decision tree models. The following subsections shed further light on the data analysis techniques used in the study.

4.5.1 Data Analysis as Comparison and as Contrast

The value of identifying and exploring paradoxes to complement the outcome of the data comparison approach as graphically shown in figure 4.3 is supported in literature (Jick, 1979).

Figure 4.3 Data Analysis as Comparison and as Contrast



Agar & Hobbs (1983) suggest an approach for the analysis of ethnographic interviews which starts with identification of patterns from common quotes and paraphrased common ideas from the informants. Ethnographic interview data is classified according to emerging patterns which are then combined into sub-themes and an argument developed (Agar & Hobbs, 1983).

4.5.2 Personal Reflection Analysis Versus Computer-aided Analysis

Whereas several qualitative data analysis applications such as Nvivo, Nod*IST, Atlas* TI inter alia have been rolled out in the last couple of decades, some researchers contend that the software cannot yield reliable results on its own without the inquirer's deep personal reflection. To them a computer is a machine and no matter how much intelligence is built into it, it remains a garbage-in-garbage-out (GIGO) device (Leunens et al., 1992). This conceptualisation grounds the argument that the quality of input is a determinant of the quality and reliability of the output data and that it is human agency that has to ultimately make sense of the final output (Wolcott, 1994). Developing structures and themes, argues Sawyer (2001), is more imperative in qualitative data analysis. Qualitative researchers have to maintain a paper structure alongside a digital structure generated by software tools (Sawyer, 2001). Therefore personal reflection in qualitative analysis is comparatively more effective than a fully automated process. And as Sawyer (2001, p. 90) argues, 'deep reflection is a common aspect of much research'.

To this end, the notion of analytic integration of data analysis across the three phases of this research was achieved by engaging in an on-going critical and deeply reflective data analysis that aided the making sense of the mixed forms of field data. This process was further underpinned by (1) using explanatory matrices (2) building evidence chains where ‘an issue is stated and its supporting evidence is laid down’ and (3) by use of reflective comments on field journal or notes (Miles & Huberman, 1994). The construction of the evidence chains and the explanatory matrices in data analysis both call for immersion in the multiple data sets to develop ways to categorize the corpus of data and to extract the segments that are relevant to the research phenomenon and the research questions (Miles & Huberman, 1994).

In the initially there was some resistance to audio-video recording and target informants declined to give us copies of MSMEs’ mobile-banking operational documents with some citing the confidentiality of information as critical to their business. This early field experience made the researcher to change tact and thus endeavored to write up comprehensive field journal/notes using a blank copy of the interview guide for each informant even in cases where the informant consented to audio and or video recording.

4.6 Conclusion

EDTM is therefore suited to investigate the study’s phenomena since (i) as a multi-method approach it integrates both qualitative and quantitative data (Beck, 2005; Sawyer, 2001), (ii) EDTM is interpretive and helps to examine the research problem from the perspective of the social actors themselves (Gladwin, 1989c) (iii) EDTM is structured in a way that overcomes the dichotomies of the ‘hard’ and ‘soft’ camps (Fitzgerald & Howcroft, 1998), and lastly (iv) EDTM confers an opportunity to examine the informants’ choice behaviour on the bold assumption that ‘decisions contain hidden information’ (Gladwin, 1976; Murray-Prior, 1998). Having adopted EDTM as a research strategy, this study was conducted in three key phases namely, the preliminary phase or the initial phase where exploratory free-ranging interviews were conducted on a convenience sample of informants; a model building phase or the intermediate phase where tasks are designed to expand, elaborate and verify decision criteria on a purposive heterogeneous sample of informants; and finally the model testing phase or the

final phase of the qualitative data collection and analysis in which the descriptive model is tested on an independent representative sample drawn from the MSME population (Beck, 2005; Gladwin, 1989a). A two-stage ethnographic decision tree model created and tested on two different samples represents an acceptable level of reliability if it predicts 85% to 95% of group choice behaviour (Gladwin, 1989a). Table 4.4 offers a snapshot of this study's research philosophy.

Table 4.4 Summary of Philosophical Underpinnings

Ontology	Relativism (Fitzgerald & Howcroft, 1998)
Epistemology	Interpretivism (Walsham, 2006)
Methodology	Ethnographic decision tree modeling (Gladwin, 1989a)
Axiological stance	Design of mobile banking regulatory frameworks

Chapter 5: Data Analysis for Mobile Banking Initial Adoption and Actual Usage Decisions by Kenyan MSMEs

5.1 Introduction

This study constitutes a two-stage EDTM research programme which empirically investigates the registration decision and the actual usage decision made by Kenyan MSMEs in relation to the adoption and actual usage of mobile banking technology. The first stage examines the decision criteria that Kenyan MSMEs evaluate when initially deciding to register for a mobile banking service while the second stage explores the decision criteria relating to the MSMEs' actual usage choices in a business context when interacting with customers and suppliers. The use of EDTM as a research strategy for the empirical investigation was considered ideal since mobile-banking technology like other ICT4D initiatives, may yield anecdotal impact that is hard to measure (Gomez, 2008; Gomez & Pather, 2011). Each of the two broad empirical stages followed the EDTM modeling approach discussed in section 4.3 and therefore included a model-building phase and a model-testing phase (Gladwin, 1989a).

5.2 Descriptive Statistics

This section presents the descriptive statistics obtained after analyzing data collected from a stratified sample of 45 MSMEs using the *Interview Guide* shown in Appendix II and which was earlier discussed in sub-section 4.4.3 in chapter four. The biostatistics of the sample elements are provided in table 5.11 further ahead. The study was organized in such a way that the tasks of interviewing, recording in the journal, asking questions and probing were shared among the research assistants and the principal investigator. This made it possible to collect multiple data sets for both ethnographic decision modeling and descriptive analysis purposes.

5.2.1 Contrasting Preference for Mobile Banking System with Alternative Modes

As figure 5.1 indicates, when asked their preferred mode of transacting, 45% ($n = 20$) of the interviewed MSMEs stated mobile banking as their most preferred method of transacting. 55% ($n = 25$) of all sampled MSMEs preferred the alternative modes, out of which 33% ($n = 15$) MSMEs said that they preferred conventional banking while 22% ($n = 10$) MSMEs

preferred cash transactions. However all MSMEs said that a choice of the means of transacting was made at the material time and that the choice was therefore not a fixed preference. This information is significant in that 25 MSMEs represent a potential market for mobile banking technology vendors.

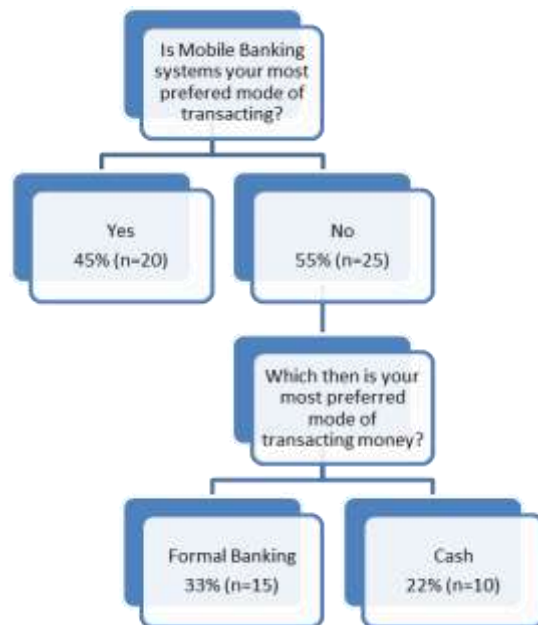


Figure 5.1 Preferred Modes of Transacting Among the Sampled MSMEs: From Descriptive Statistics Analysis

This study's findings cover the period between years 2007 and 2012. However the empirical work took place from January to December in 2012. It is evident from figure 5.2 that the adoption of mobile banking has been on an upward trend among MSMEs with slight drops in the years 2008 and 2012 from 9% to 4% and from 31% to 16% respectively.

Year registered as an MB user	Count	%
Year 2007	4	9%
Year 2008	2	4%
Year 2009	5	11%
Year 2010	13	29%
Year 2011	14	31%
Year 2012	7	16%
Total	45	100%

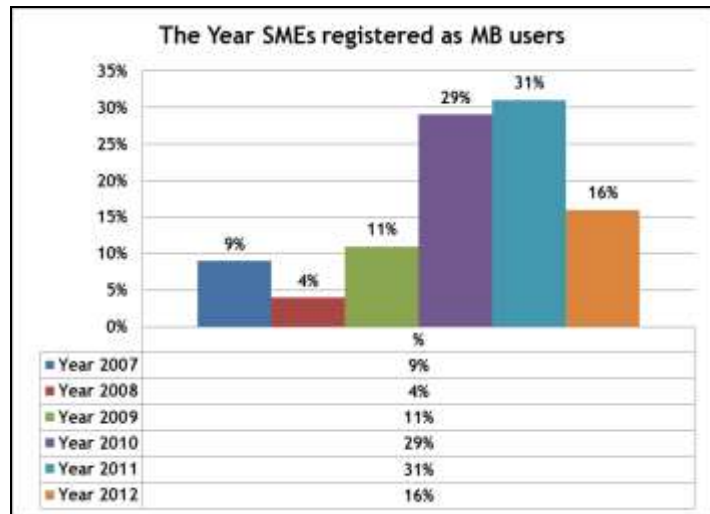


Figure 5.2 MSMEs' Year of Mobile Banking Adoption: From Empirical Data

Figure 5.3 indicates that the banks and media account for 78% sources of information used to drive adoption of mobile banking technology among the MSMEs. This information may be used to design marketing drives by banks through media or when customers come for other services over the counter.

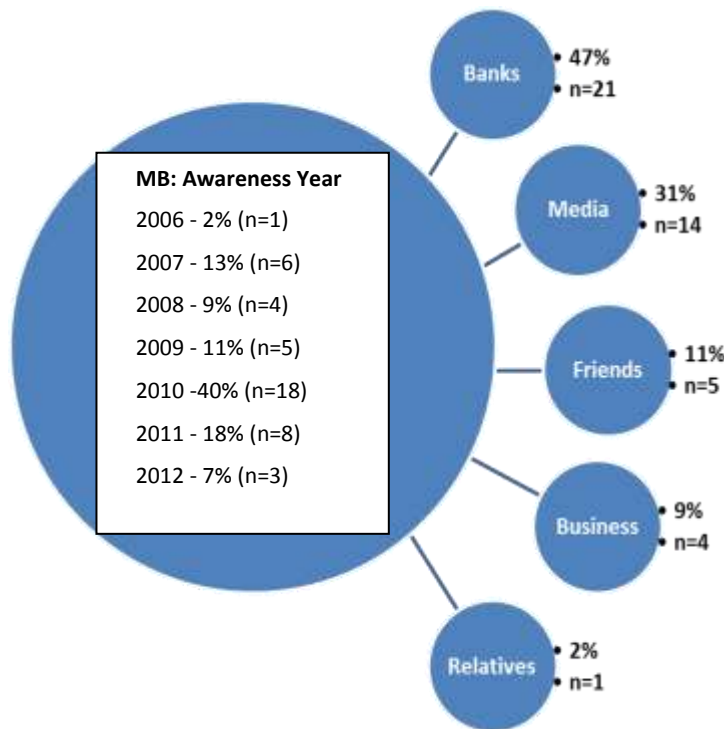


Figure 5.3 Sources of Information on Mobile Banking Service for MSMEs

5.2.2 MSMEs' Perspectives on the Transformational Role of Mobile Banking

As figure 5.4 shows, 87% as opposed to 13% of purposively sampled MSMEs indicated that the adoption of mobile banking technology has positively impacted their business operations. Like their counterparts in the preliminary sample, they cited temporal value such as saving time, transactional value such as ease of depositing and withdrawal as well as safety and security of business operator and funds, improved business relations value, improved savings value, spatial value such minimal physical movement to banks, and informational value such as access to bank balances for use in business planning.

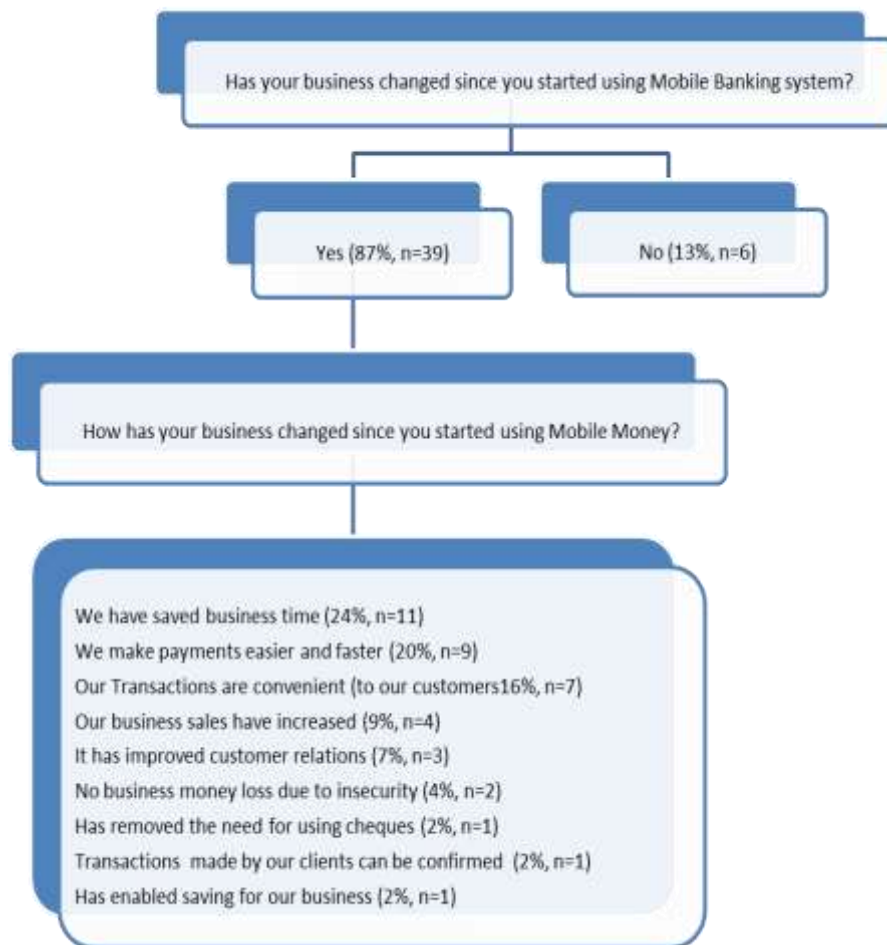


Figure 5.4 MSMEs' Transformation as Occasioned by Mobile Banking Technology

Using a scale of [1] and [4] for 'Strongly Disagree' and 'Strongly Agree' respectively, table 5.1 presents results that underscore the potential of mobile banking as a means of promoting a savings culture among MSMEs.

Table 5.1 Descriptive Statistics on Accessibility, Registration, Savings Capability, and Customer Service Experience of Mobile Banking Technology

Descriptive Statistics					
Statements/Variables	N	Min	Max	Mean	SD
Mobile banking services are more accessible than traditional banking services	45	4	5	4.22	0.42
Mobile banking registration process is easier than opening a formal bank account	45	1	5	3.75	0.88
Mobile banking technology helps save more as compared to traditional banking services	45	1	5	3.24	1.21
Mobile banking process offers better customer service than traditional banking services	45	1	5	3.22	1.04

According to figure 5.5, 76% or 34 out of the 45 sampled MSMEs indicated that they frequently transacted using mobile banking which is a pointer to the potential of mobile phones to bank the unbanked (Duncombe & Boateng, 2009).

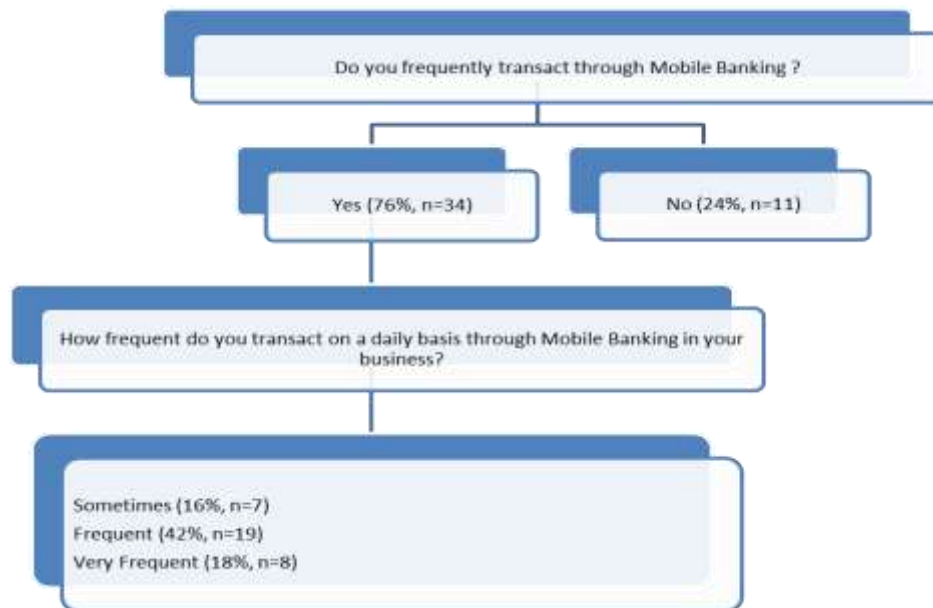


Figure 5.5 Frequency of Mobile Banking Transactions

5.2.3 MSMEs' Perceived Negativity of Potential Inaccessibility of Mobile Banking

77.8% of all informant MSMEs said that their businesses would be severely affected if mobile banking system ceased to be available. It may therefore be inferred that the adoption of mobile banking technology among Kenyan MSMEs has created a complex network of business relations linking up entities at the micro, meso and macro levels of the economy who include MSMEs, their suppliers and customers, financial institutions, mobile telecommunications firms whose collapse would severely affect the MSMEs in the country. Therefore mobile banking related policy design should broadly secure the virtual relations of autonomy and interdependence to ensure uninterrupted growth of MSMEs (cf. Jones & Karsten, 2008). As figure 5.6 clearly indicates for the sampled MSMEs, saving time for business as well as improved security and safety of self and business cash through the usage of mobile banking technology were more critical features of its adoption as compared to lowering transactional cost, serving distant customers, and promoting personal savings.

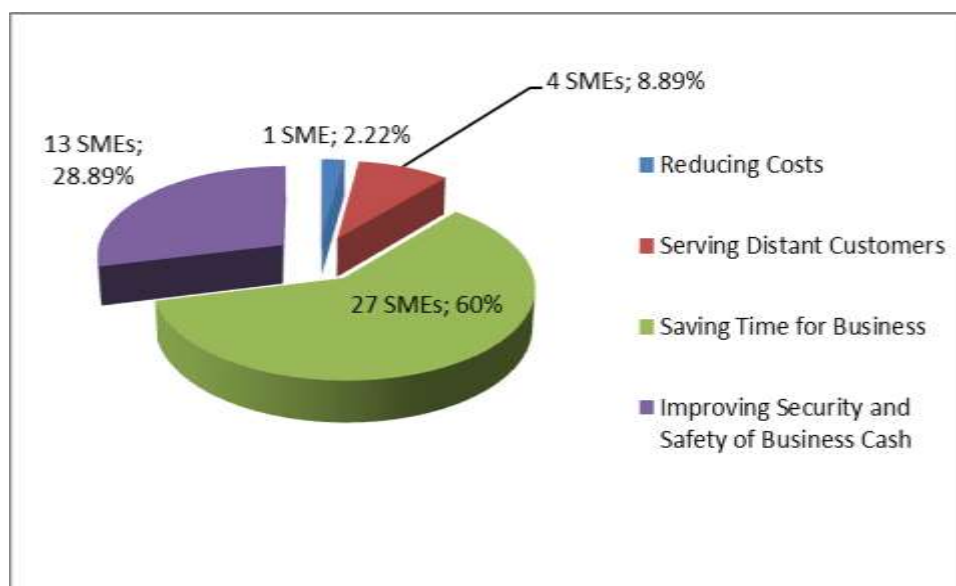


Figure 5.6 Rating of Factors of Adoption by MSMEs

5.2.4 MSMEs' Business-Oriented and Personal Mobile Banking Transactions

Ethnographic interviews revealed that 78% (n = 35) of the informants had a dedicated cell phone for the business transactions and did not use the personal mobile phone as opposed to the 22% (n = 10) who had dual-purpose cell phone for personal and business use. Majority of

the informants cited business-oriented mobile banking transactions such as: deposit cash (22%), Paying MSME's utility bills (22%), pay some suppliers (22%), receive payment from some customers (9%), check bank account transactions (3%), withdraw cash (2%) and repay bank loans (4%). The informants also cited personal transactions that they enacted using mobile banking and mobile payment systems including: making remittances to family members and relatives (40%), pay utility bills (27%), shopping (6%), pay school fees (4%), transfer funds to personal bank account (7%), withdraw cash (2%), saving money (4%), request for mini bank statement (2%). Therefore the bulk of the business mobile banking transactions related to depositing business cash and paying utility bills, while at personal level the technology aided the MSME operators to pay the family utility bills and make remittances to their folks.

5.2.5 Differentiation of Mobile Banking Service from Available Alternatives

When asked whether there are services they got from the mobile banking systems that are not available in traditional banking, 56% (n = 25) of the sampled MSMEs gave a 'no' response while 44% (n = 20) gave a 'yes' response citing such reasons as direct deposits into the bank account, withdrawing money through the cell phone and encashing with money transfer agent, making instant payments, buying air time buying internet bundles, paying both business and personal or family bills such as water and electricity, requesting for bank statement online among others.

5.2.6 Influence of Cell Phone Type on MSME's Usage of Mobile Banking

Majority of the sampled informants, that is 62% (n = 28) of MSMEs said that the type of cell phone they use to access their bank account through the mobile banking application did not matter as opposed to 17 MSMEs or 38% who stated that the cell phone type mattered for reasons such as lack of or availability of internet, ability to store charge for a long period of time, capacity of twin Subscriber Identity Module (SIM) cell phone to connect to two mobile network operators, attractiveness of sophisticated smart phones to thieves, usability of the graphical user interface of the cell phone, and status. As figure 5.7 reveals 73% of MSMEs either used ordinary or very simple cell phones in their transactions.

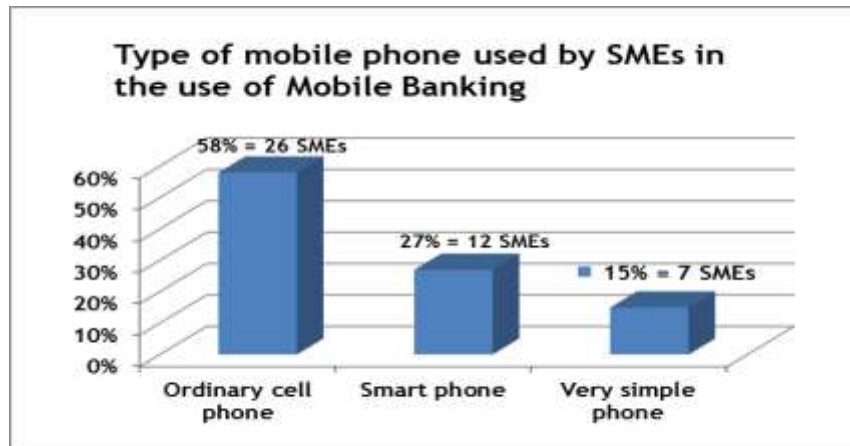


Figure 5.7 Type of Mobile Phone Used by MSME with Mobile Banking

In addition, certain factors are considered when MSMEs are choosing a mobile money transfer agent. For instance, 76% (n = 34) of MSMEs said that they used different money transfer agents while 24% (n = 11) stated that they used the same agent. As can be seen in the table 5.2 the MSME's use of the same or different money transfer agents depended on a number of factors.

Table 5.2 Reasons for Using the Same or Different Agents in Mobile Banking Transactions

Reasons for using same or different agent MB transactions	Frequency	%
It depends on the current of MSME informant	26	58%
Sufficiency of mobile money float with an agent	10	22%
Security and safety of using the same agent	3	7%
Availability and accessibility of agent (s)	2	4%
Good relationship and trust with the agent	2	4%
Agent's customer relations skills	1	2%
Nature of transaction being made	1	2%
Total	45	100%

5.2.7 Challenges Encountered by MSMEs when Using Mobile Banking Technology

Inadequate float or maximum float levels were cited as critical to the MSME business operation. For instance the MSMEs withdraw funds from the bank account perhaps to pay a supplier who is waiting over the counter, but cannot withdraw cash from the money transfer agent since the latter has reached the maximum electronic amount allowable per day on the mobile money account by the mobile network operator (MNO). Other challenges of using mobile banking cited by the sampled MSMEs included: falling victims of SMSs sent by fraudsters; poor customer service by transfer agents and bank agents; incurring multiple charges levied by MNOs, banks, and money transfer agents; and network downtime and delays.

It should be noted from table 5.3 however that 62% (n = 28) of MSMEs considered network downtime as the most critical of all aspects that invoke fear when using mobile banking. For instance MSME informant 23 said,

“Network delay or downtime is more serious than sending money to the wrong customer since the former unlike the latter is not under my control. I just need to exercise greater care when selecting the cell phone number and I am okay. But if I execute a mobile banking command to withdraw some funds from my account and the network fails midstream, there is nothing I can do immediately except waiting for the vendor’s advice. If no response comes then I have to go physically”.

Table 5.3 Key Challenges Encountered when Using Mobile Banking System

What key challenges have you encountered while using mobile banking service?	Frequency	%
Network downtime and delays in transaction	28	62.2%
Transactions to wrong recipients	4	8.9%
Poor customer service from money transfer agents	2	4.4%
High mobile banking charges	2	4.4%
SMSES from fraudsters	2	4.4%
Denial of service for lack of ID to support a transaction	1	2.2%
Double charging in a single transaction	1	2.2%
Lack of reference documentation to prove a transaction	1	2.2%
Denial of service due to insufficient float amounts	1	2.2%
Retrieving mobile banking PIN	1	2.2%
No response when seeking service	2	4.4%
Total	45	100%

As can be seen in figure 5.8 MSMEs are faced with several challenges when it comes to practical usage of mobile banking technologies in the Kenyan context which include fraud, network delays and sending money to the wrong person.

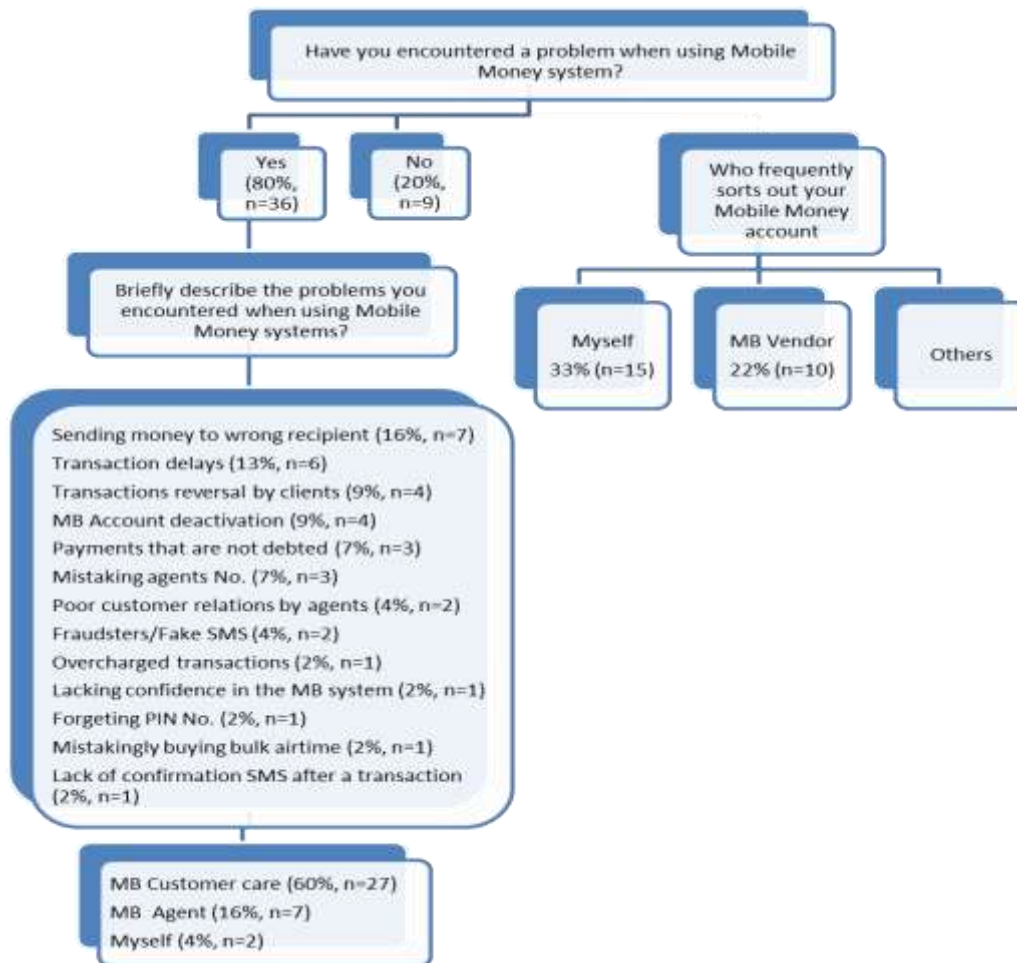


Figure 5.8 Problems Encountered by MSMEs when Using Mobile Banking Service. Derived from the responses of the MSMEs in the sample.

5.2.8 Awareness of Regulations Governing the Use of Mobile Banking

Table 5.4 indicates that 60% of the 45 sampled MSMEs were aware of the regulations put in place to ensure safe usage of mobile banking technology unlike the 40% who seemed less informed about the rules.

Table 5.4 MSMEs' Awareness of the Mobile Banking Usage Rules and Regulations

Examples of rules and regulations that SMEs are aware of	Frequency	%
Produce ID card when transacting	14	31%
Must be careful when making transactions	4	9%
PIN Number is secret / Must remember your m-banking PIN.	3	7%
Subscribers must be registered in order to transact	2	4%
One must be fast in the transaction procedure	2	4%
Maximum and minimum floats set by vendor	2	4%
Total	27	60%

Table 5.4 further indicates that most MSMEs were much less aware of the crucial features of mobile banking application such as the need for identification document as well as the maximum and minimum floats.

5.2.9 Feedback Mechanisms for Relaying Concerns to Mobile Banking Vendors

67% (n = 30) of MSMEs according to table 5.5 felt that the feedback mechanisms for relaying problems to mobile banking service vendors were adequate and effective while 33% (n = 15) of MSMEs said the mechanisms were either unavailable or inadequate.

Table 5.5 MSMEs' Perspective of Feedback Mechanism in Mobile Banking Service

SME satisfaction with feedback mechanisms in place	Frequency	%
Satisfied with mobile-banking feedback systems	30	67%
Unhappy with the feedback mechanisms	15	33%
Total	45	100%

From table 5.6 high transaction cost (69%) and mobile network delays (11%) emerged as the most limiting characteristics of mobile banking for MSMEs. Mobile banking vendors and mobile network operators may use this information to increase the quality of their service offerings and for customer retention. To mitigate the effect of the said challenges, most informants pointed out that they kept switching from one vendor to another.

Table 5.6 Features of Mobile Banking that Strain MSME Business Operations

Aspects of mobile banking system hindering business operations	Frequency	%
High transaction charges	31	69%
Transaction delays	5	11%
Transactions are insecure	2	4%
It leads to impulse buying	1	2%
It's difficult to use transaction menus	2	4%
Vendors are not conversant with the MB system	1	2%
Sending money wrong recipients	1	2%
No response	2	4%
Total	45	100%

5.2.10 Fears Invoked in MSMEs when Using Mobile Banking System

Although all the 45 MSMEs in the purposive sample used mobile banking technology in their business transactions, table 5.7 indicates that 33.33% (n = 15) of MSMEs said they did not harbor any fears when using the technology. However, 66.7% (n = 30) of the MSMEs indicated that the usage of mobile banking invoked fear in them during a transaction. Such fears are a deterrent to technology adoption and such knowledge may be used to design customer training and marketing programs and strategies.

Table 5.7 Cross Tabulation of the Fears Invoked by MSMEs' Mobile Banking Usage

Fears	Whether MB use invokes fear	Invoke fear	Doesn't invoke fear	Total
Fears nothing	Count	0	15	15
	% of Total	0.00%	33.30%	33.30%
Loss of phone with personal details	Count	1	0	1
	% of Total	2.20%	0.00%	2.20%
Cyber crimes	Count	5	0	5
	% of Total	11.10%	0.00%	11.10%
Insecurity of transactions at Agents Kiosks	Count	7	0	7
	% of Total	15.60%	0.00%	15.60%
Sending money to wrong recipients	Count	5	0	5
	% of Total	11.10%	0.00%	11.10%
Network delays	Count	5	0	5
	% of Total	11.10%	0.00%	11.10%
Float limitations	Count	1	0	1
	% of Total	2.20%	0.00%	2.20%
It is risky if you are not careful	Count	2	0	2
	% of Total	4.40%	0.00%	4.40%
Having less money for transactional charges	Count	1	0	1
	% of Total	2.20%	0.00%	2.20%
Security of PIN No.	Count	3	0	3
	% of Total	6.67%	0.00%	6.67%
Total	Count	30	15	45
	% of Total	66.70%	33.30%	100.00%

In addition, table 5.8 exposes monetary float shortages as a critical limitation of mobile banking to the operations of MSMEs. About 51% argued that many small transactions were more expensive. On further probing, some informants said they preferred formal banks because they almost always have enough cash even though their services were time consuming.

SME Informant no 19 responded:

“...rather than keep hopping from one small money transfer kiosk to another looking for cash, I go to the bank which is quite far when I have a huge transaction”

Table 5.8 Effect of Monetary Float Limits set by Vendors on MSME's Operations (From Empirical Data)

How do the float limits set by MNO restrain or enable your business operations?	Frequency	%
Transacting small amounts or costly multiple transfers in case of larger amounts	23	51%
Cannot exceed float amounts set by mobile banking vendor	8	18%
A lot of time is wasted going for other means of transaction	7	16%
Inability to make purchases	3	7%
It forces one to break down money into smaller amounts	2	4%
Incur increased expenses in transacting through other means	1	2%
Loss of customers who may want to transact higher amounts	1	2%
Total	45	100%

5.2.11 Improvements that MSMEs would like in the Mobile Banking System

Despite citing a number of operational benefits, the MSMEs suggested several additions to mobile banking services that would promote the growth of their businesses. For instance:

SME Informant 32, a 28 year old woman and dealer in agrovvet products lamented,

“Although mobile technology has made business transactions easier, convenient, and faster since one can transact anytime from anywhere, there are serious gaps that vendors need to address, especially high service charges and network down time and transaction delays”.

SME Informant 18, a 35 year old man who sells building materials and furniture expressed satisfaction with the mobile banking system when he explained his adoption decision:

“I am particularly happy with the time saved when I use mobile banking to operate my bank account from the business premises. I am able to serve more customers and meet my obligations to suppliers instead of going to queue in the banking hall or driving around looking for an ATM machine. The only problem I encounter is that some suppliers don't seem to trust it.

This may explain why some MSMEs register for mobile banking but fail to use it in business transactions in that the MSMEs' preference to pay suppliers through mobile banking is countered by suppliers' lack of trust in mobile banking payments especially where huge amounts are involved.

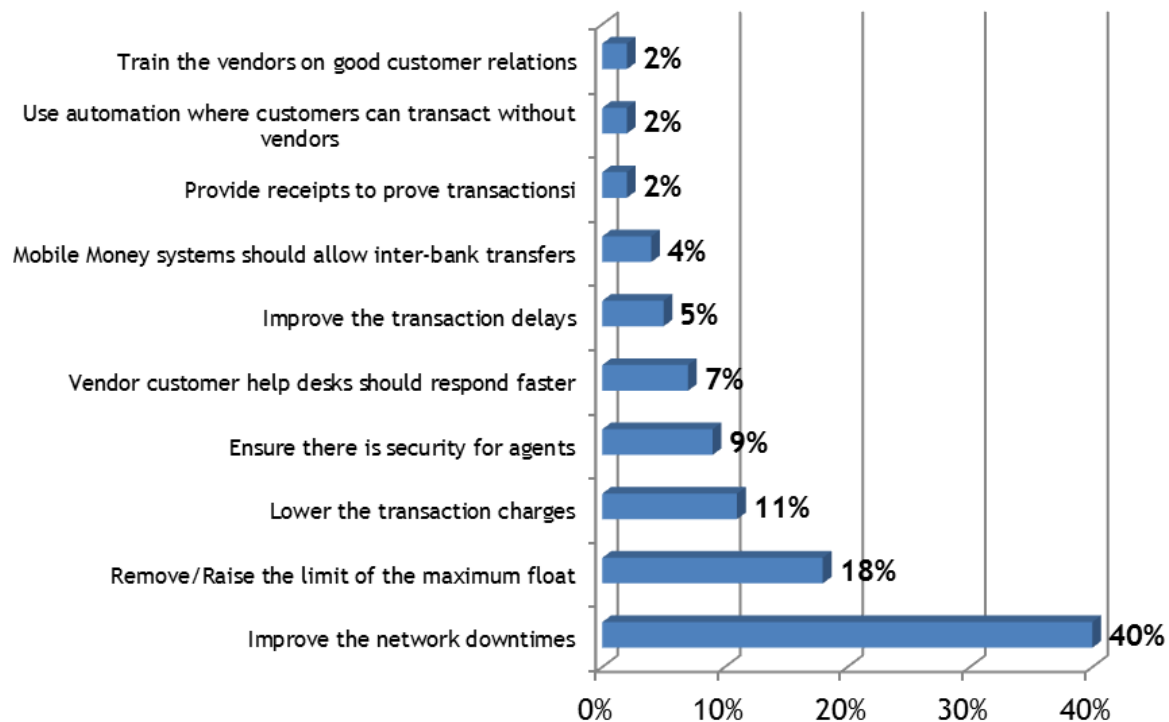


Figure 5.9 Improvements MSMEs Would Like in the Mobile Banking Service

Other improvements proposed by sampled MSMEs are shown in figure 5.9 and they include: introduce overseas transactions to support their importation business; increase the number of agents especially where the bank is using agency banking model to provide mobile banking services; reduce the cost of inter-bank funds transfers; and pay interest on mobile banking savings.

SME Informant 41, a dealer in clothing and textile while sharing the views of Informant 18, further added,

“Apart from improving my own security and safety since I do not have to carry the business cash home or leave it in the premises, mobile banking has helped me to improve my bank savings through daily account deposits. The system has helped me to build a creditworthy profile that has given me access to funding from my bank and other microfinance institutions”.

5.3 Stage One/Preliminary Investigation: Mobile Banking Adoption Decision Analysis

The initial empirical work sought to identify the decision criteria utilized by MSMEs when making the initial decision to enroll for mobile banking. Apart from investigating the mobile banking registration decision, the preliminary phase of stage one was conducted to identify reliable informants and filter out non-users who are mere subscribers of mobile network operators and to test the effectiveness of the data collection instruments, techniques and tools that included the consent form, interview guide, participant observation checklist, document requests, audio-video recording. The preliminary phase was also used to train the two research assistants hired and to find out the most feasible way to share data collection tasks i.e. interviewing, audio-video recording, writing field notes/journal, and conducting participant observation at the MSME site. Although purposive sampling was used for the initial stage and stratified sampling for the model-building phase, random sampling was employed in the model testing phase.

5.3.1 Characteristics of MSMEs Involved in the Preliminary Phase

The study included only those MSMEs that operated from a specific address with identifiable business premises and therefore left out the more common ‘nomadic’ micro businesses such as roadside vendors with whom it was deemed hard to recheck a choice criterion obtained in a past interview. In the Kenyan context there is an interesting interplay between such social practices as subscribing to a mobile network, registering for a network-led money transfer service such as M-PESA, opening a bank account, and registering for mobile banking services so as to access and operate a formal bank account through the cell phone. These activities involve independent but interrelated decisions taking place at different time-space contexts.

5.3.2 Results of Preliminary Phase and Registration Decision Tree Model

In his attempt to distinguish ‘description’, ‘analysis’, and ‘interpretation’, Wolcott (1994, p. 1) contends that the ‘real mystique of a qualitative inquiry lies in the processes of using and transforming data into intelligible accounts rather than on gathering it’. This section presents the ethnographic decision model built from the voluminous data gleaned from the 15 MSMEs and tested on a stratified sample of 31 MSMEs during the study’s preliminary phase. This is

however preceded by descriptive statistics that indicate that 80% of the informants preferred simple-to-use cell phones, 13% preferred sophisticated smart phones that gave them access to valuable account information such as bank statements, while 7% said they had no specific preference and all they wanted was a phone able to transfer money to and from the bank account. The sampled MSMEs variously cited a number of expectations that they had at the point of registering for a network-led mobile payment service which included: getting safe custody for business cash, easing micro-payment transfers from customers and to suppliers, and also to facilitate direct bank deposits via cell phone. They were however quick to point out that for huge amounts, a banker's cheque was preferable because of security issues. Figure 5.10 provides an analysis of whether or not the MSME informant's reasons for registering for mobile finance service had been met.

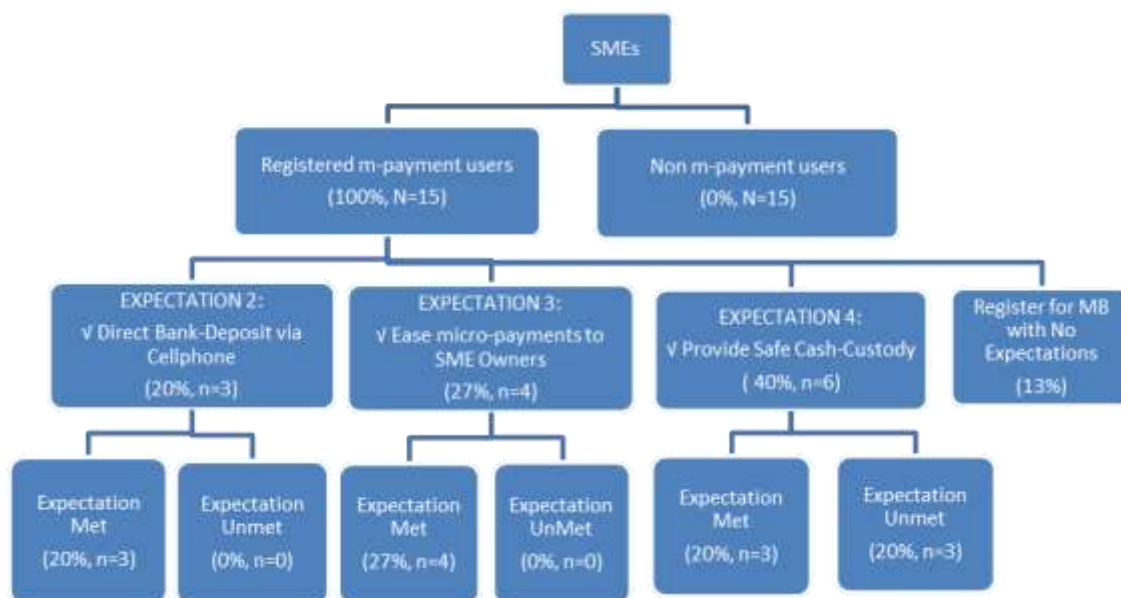


Figure 5.10 Met and Unmet Mobile Finance Expectations of MSMEs: Derived from Empirical Data

From this flow chart we find that MSME's registration expectation to aid direct bank deposit of daily income to ease micropayments from and to suppliers were fully met. Notably, 40% of the MSMEs hoped to get a safe cash-custody for their cash from the network-led mobile payment registration. But only 20% of MSMEs in this category indicated that their expectation had been satisfied by mobile money service while the other 20% said their need for custody wasn't fully met. This empirical observation necessitated a modification of the interview guide to find out why the mobile money service did not meet the need for cash

custody for some MSME's in subsequent interviews with the purposive sample. Asked why her MSME's need was not met, MSME *Informant 10* responded:

"...on most occasions our daily sales turnover is more than Kenya shillings 70,000, the maximum mobile-money limit allowed on M-PESA account. I load 70k on my mobile phone and I've to carry the rest to the house. Remember ours is a small business that has to close late when all banks have closed so as to make ends meet"

A close examination of this response seems to point to the existence of structures of domination (Giddens, 1984) set up by the mobile network firms relating to mobile money savings (float) limits. Upon further probing, *Informant 10* revealed that the M-PESA tariffs⁵ are a deterrence in that for her to pay an M-PESA-registered supplier Ksh 270,000 at a rate of Ksh 110 per transaction, she would execute 4 transfers of Ksh 70,000; Ksh 70,000; Ksh 70,000; and Ksh 60,000 thus costing Ksh 440 that is, $110 * 4$. Additionally, a mobile payment transfer to other networks incurred a fee of Ksh 330 for each Ksh 70,000 transaction. Therefore, transferring Ksh 270,000 would cost Ksh 1320 (that is, $330 * 4$) which was more than the cost of a banker's cheque and transport. Thus, it may be inferred that massive uptake of mobile-money innovations in Kenya are more likely driven by factors other than affordability which empirically contradicts some other studies (Donner, 2007; Donner & Tellez, 2008; Porteous, 2007).

In addition, mobile network choice, usage and loyalty as shown in figure 5.11 was cited by virtually all sampled MSMEs as being driven by the following factors: Network coverage and dominance (40%); Choice of the MSME's significant others in social or business circles (20%); Perceived network dependability (27%), Cost advantage (13%), Personal preference (0%). As shown in Figure 4, it seems cost advantage is not a priority or weighty factor when choosing a particular mobile money solution.

⁵ M-PESA Tariffs: <http://www.safaricom.co.ke/personal/m-pesa/m-pesa-services-tariffs/tariffs>.

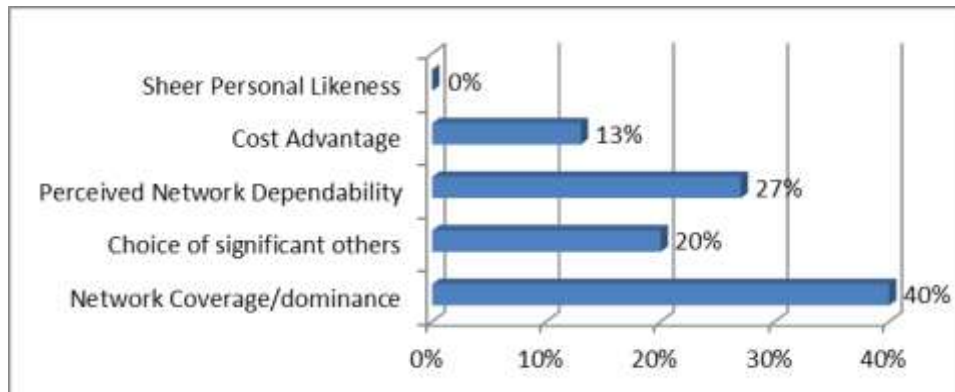


Figure 5.11 MSMEs' Reasons for Choosing a Mobile Network Solution, From Empirical Data

Some of the MSMEs raised concerns that the M-PESA based ATM withdrawal fees were too high for their MSME transactions citing that they hardly use the ATM service. For instance any amount withdrawn in the transaction range of Ksh 10,001-20,000 incurred an automatic charge of Ksh 193 which was nearly 6 times higher compared to the traditional bank-based ATM withdrawal charge that the MSMEs in the sample put at between Ksh 25 and Ksh 30.

The decision criteria were obtained by sifting through MSME responses and looking for temporal, spatial, informational, and transactional contrasts that represent the criteria advanced for registering for mobile banking service and the reasons why the services were declined (Gladwin, 1989a; Ryan & Bernard, 2006). The study analyzed the socio-cultural reasons and constraints given by the MSME informants, paying greater attention to their local terms, to avoid the fate of the *'ethnographer...who prefers the complicated and esoteric explanations ends up missing the boat on prediction rates'* (Gladwin, 1989a). Accordingly, the reasons given for and against MSMEs' registration for the mobile banking service were classified according to the four value propositions shown in tables 5.9 and 5.10.

Table 5.9 Premises Advanced by MSMEs for Enrolling for the Mobile Banking Service: Derived from Empirical Data

Reasons Given for Mobile Banking Service Registration	Nature of choice criteria
Mobile banking gives me access to and allows me to track my bank account transactions, otherwise how will I know when things go wrong	Informational value
I don't make much money from my business and if I am not careful I can consume it all so I decided to apply for mobile banking so that I could save little by little	Transactional value
Well I find the service quite helpful because I can make quick small payments especially to the people who design and distribute advertising fliers for my business	Temporal and transactional values
It helps me to save regularly as evidence of consistent cash flow just in case I need a loan from my bank	Transactional value
Although I prefer cash payments, I received a lot of requests from distant customers who want to pay from where they are and goods sent to them	Spatial value
I find mobile banking services easier to access and use than physically going to the bank every time I need money for business as I did before	Spatial value
I use the service to deposit my daily proceeds directly into my bank account instead of carrying cash home or leaving it here in the business premises	Transactional and temporal values
It gives me access to more sophisticated banking services over and above deposit and withdrawal services for the business. I can pay bills of water, electricity, and rent. For us it is a one-stop financial shop	Transactional value
It was much easier to register for the service than it was to open a bank account and registration was free	Transactional value
It saves on travel costs since my bank does not have a branch around here	Transactional value
I can access valuable business information especially the bank statements when applying for credit	Informational value
There is cost advantage to it especially when the main banks are not involved	Transactional value
It has freed my business transactions from dependence on time and location since I can deposit what I have earned during the day into the account from the comfort of my house including paying some suppliers	Spatial and temporal values
I registered so that I can receive small loans from a microfinance organization where I am a member and also be able to repay in small daily installments that are manageable for my small business	Transactional and temporal value
Loss of ID or passport does not stop me from transacting, depositing or with withdrawing since I have a good rapport with my mobile money agent whom I give cash to load into my phone and then I send it to my account	Transactional value Criterion

I am able to repay my bank loan in small daily transactions out of my not-so-much income	Transactional and temporal values
In a small business you may need money any time of day or loose a business deal	Temporal value
My business colleagues talked well of it so I decided to give a try and it has served me well since banks are not easily accessible from here	Informational and spatial value
I no longer have much fear of fake currency notes since I started using the mobile banking service, especially when dealing unknown customers	Transactional value
The service is not really cheap, but it makes it very convenient to pay distant suppliers where small amount is involved	Spatial and transactional values
By using one agent always I am able to call and ask him to receive payment directly from a trusted customer thus saving cost and time	Transactional and temporal value
I run my business singlehandedly and I hardly have time to step out to go and queue in a banking hall. This service is like having a bank in the pocket all the time	Temporal and spatial value
I use mobile banking not because it's cheap but because it saves time	Temporal value
Mobile banking service makes me feel as though I am in full control of my business operations. Otherwise I don't like the queuing bit and time wastage in banking halls	temporal and spatial value
If some of my suppliers and customers are using it then I have no much choice	Informational value
The nature of my business and my clientele who are mainly military personnel sometimes sent to work in remote places forced me to register for mobile banking to facilitate their rental payments. When they deposit money into my business account I get a notification SMS	Transactional and spatial value criterion

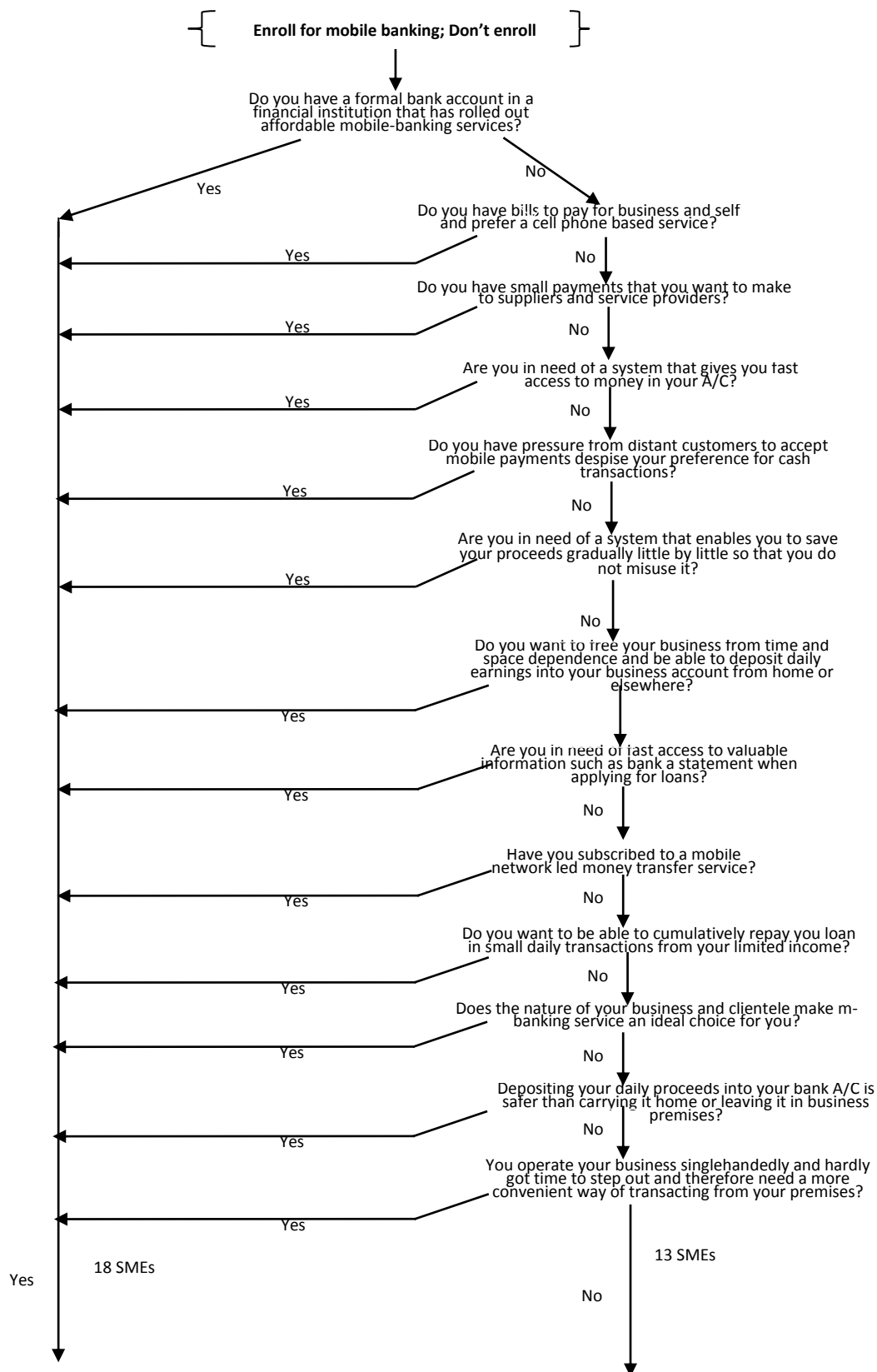
Table 5.10 lists the reasons cited by MSMEs for not adopting mobile banking.

Table 5.10 MSMEs' Premises for Not Enrolling for the Mobile Banking System: Derived from Empirical Data

Reasons / Constraints Given for Not Registering for Mobile Banking Service	Nature of decision constraint
I prefer the use of receipts stored in a physical file for the purpose of inventory and sales reconciliations, instead of scrolling through mobile money SMSs, which may not be there anyway. After all the mobile phone can get lost with all your sales SMSs	informational constraint
I fear the fraudsters, what if I receive a mobile payment from a distant customer and dispatch the goods and then he or she calls the network's customer care center purporting to have sent the money to the wrong number and blocks me from withdrawing the money	spatial value constraint
I find use of alternative means of transacting through cash or direct bank deposit much easier and safer	Transactional constraint
I don't know how the service works and so I prefer cash transactions	Informational constraint
I find mobile banking charges very high compared to conventional banking. Very costly for small businesses like mine	Transactional constraint
What if thieves have access to my phone and coerce me to disclose my mobile banking PIN	Transactional constraint
The problem of mobile banking is that it gives you easy access to the money and increases chances of making unnecessary withdrawals that may end up hurting the business	Transactional constraint
Some of my friends have really suffered trying to follow up disputed mobile banking payments and had to involve too many parties, courts, police and the bank. For example the	Transactional constraint

mobile networks cannot print a statement without a court order. It's too costly depending on the amount you are following up	
Transacting in large amounts is too expensive given the maximum value per transaction and you may have to make multiple transactions thus doubling the cost. They say it's for security purpose but it is too expensive for our small business	Transactional constraint
I prefer cash payments and direct bank deposits from customers, therefore to overcome the incessant service delays and queuing I have registered for the executive banking service for which I pay Ksh 500. I think I can afford it	Transactional constraint

Jonsen & Jehn (2009) argue that although observational data are micro-analytical glimpses of short periods of activity, tree graphs provide perhaps a more sense-making picture of what is happening from the informants' perspective and minimizes the effect of the researcher's own subjectivity that is inherently embedded in observation techniques and interpretation" (p. 136). Figure 5.12 presents the composite model of the decision criteria underpinning the adoption of mobile banking systems by Kenyan MSMEs.



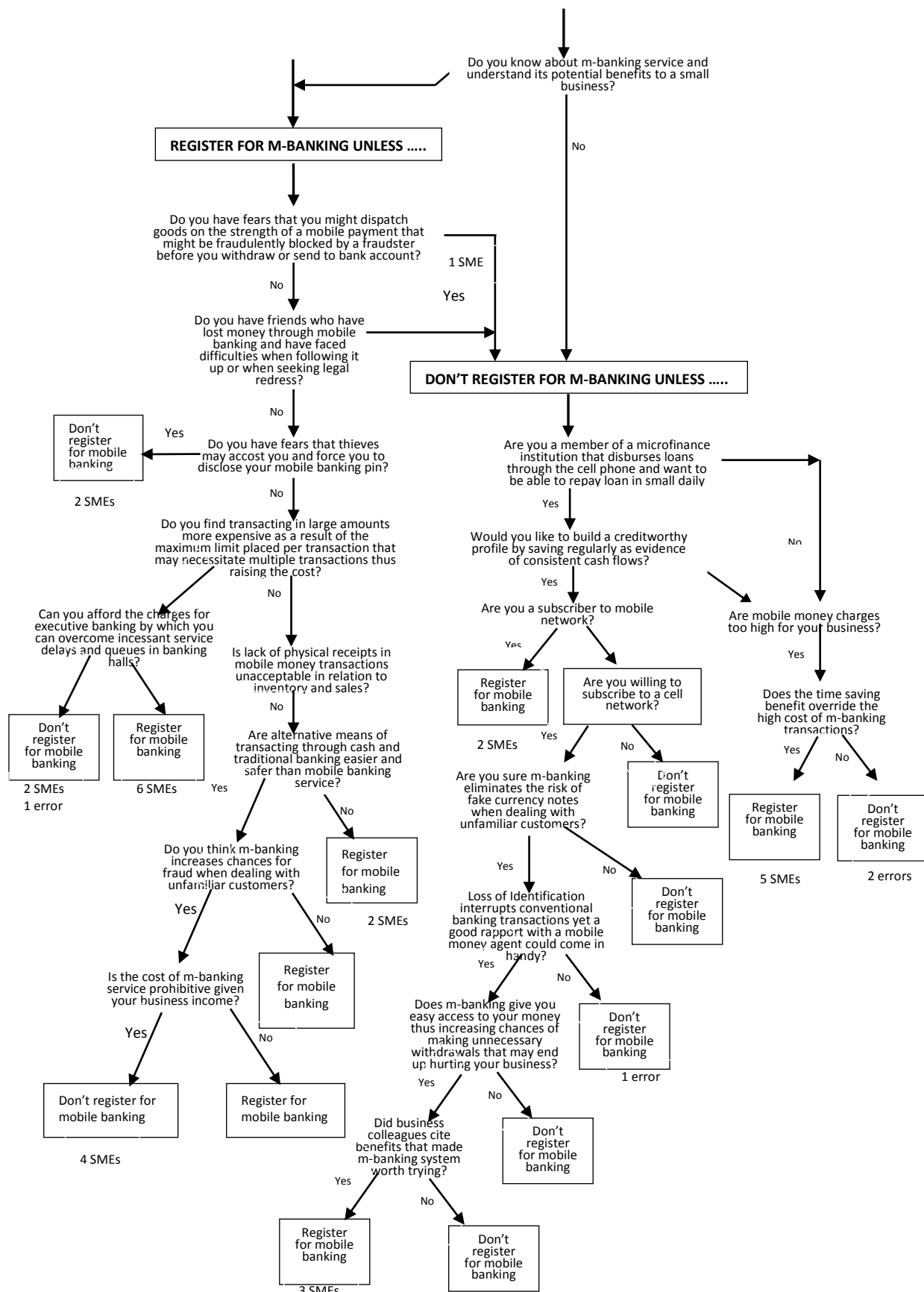


Figure 5.12 A Composite Ethnographic Decision Tree Model of the MSMEs' Decision to Adopt or Not Adopt the Mobile Banking Technology

5.3.3 Validation of the Mobile Banking Technology Adoption Decision Model

The initial adoption decision model in figure 5.12 was tested on 31 MSMEs and was found to have a predictability rate of 87%, which is higher than the recommended minimum of 85%, that is $\{(27 \text{ successes} / 31 \text{ observations}) * 100\}$ (Gladwin, 1989a). From this predictive decision model we can infer that Kenyan MSMEs' mobile banking adoption and non-adoption decisions are more influenced by endogenous choice criteria than they are motivated by exogenous criteria emanating from other entities such as suppliers and customers. This is a pointer to a lack of awareness on the part of vendors to up-scale the knowledge of mobile banking users through a more customer-focused education and training programme to enable them make informed choices and tap the potential functionality offered by such ICT innovations (Ghezzi et al., 2010; Ozigbo, & Ezeaku, 2009). Some informants cited cost-cutting potential as one of the decision criteria that motivated their adoption decision. Accordingly, service affordability strategy might be used by the government to achieve its financial-deepening agenda whose goal is to bring on board the financially excluded persons.

5.4 Stage Two /Final Investigation: Mobile Banking Actual Usage Decision Analysis

Mobile banking technology is one of the means of enacting a business financial transaction among other methods open to an MSME including bank drafts, banker's cheques, electronic funds transfer, money orders, and cash methods. The actual usage of mobile banking system in real-time transactions is therefore the outcome of a decision process. The second phase modelled the decision of the registered MSMEs to actually use mobile banking technology during a real-time business transaction. The "actual-usage" decision modeling yielded two ethnographic composite decision models presented in figures 5.14 and 5.15.

5.4.1 Characteristics of MSMEs Involved in the Actual Usage Decision Modeling

As earlier explained in section 4.4.1, stratified sampling as recommended by Gladwin (1989a) was used where 45 MSMEs that had already registered for mobile banking service were purposively sampled for heterogeneity across gender, age, education, position of the informant in MSME, business location, and size classification as micro, small, or medium.

Table 5.11 Social and Demographic Attributes of MSME Informants, From Stratified Sampling

1. GENDER				5. BUSINESS LOCATION		
Gender	Frequency	Percent		Business Location	Frequency	Percent
Male	33	73.3		Nairobi, urban	3	6.7
Female	12	26.7		Environs: peri-urban	42	93.3
Total	45	100		Total	45	100
2. AGE				6. BUSINESS AREA		
Age	Frequency	Percent		Business Area	Frequency	Percent
16-20 yrs.	1	2.2		Baba Dogo	1	2.2
21-25 yrs.	13	28.9		CBD	1	2.2
26-30 yrs.	19	42.2		Kirigiti	3	6.7
31-35 yrs.	4	8.9		Githurai 45	5	11.1
36-40 yrs.	2	4.4		Juja	4	8.9
Above 40 yrs.	6	13.3		Kiambu	1	2.2
Total	45	100		Kahawa Wendani	6	13.3
				Kasarani	3	6.7
3. EDUCATION				Kenyatta Road	1	2.2
Highest Education	Frequency	Percent		Mathare North	4	8.9
KCSE	13	28.9		Mwiki	6	13.3
Diploma	20	44.4		Nairobi Town	1	2.2
Degree	10	22.2		Nakuru	1	2.2
Masters	1	2.2		Roysambu	4	8.9
Total	44	97.8		Thika	3	6.7
				Zimmerman	1	2.2
				Total	45	100
4. INFORMANT POSITION				7. MSME CLASSIFICATION		
SME Position	Frequency	Percent		SME Classification	Frequency	Percent
Owner	28	62.2		Micro	38	84.4
Manager	9	20		Small	6	13.3
Senior Employee	8	17.8		Medium	1	2.2
Total	45	100		Total	45	100
NB: The Two models were constructed from the 45 sample size and tested on a other 89 MSMEs						

5.4.3 Modeling Actual Usage Choices: MSMEs' Decision to Pay a Supplier through Mobile Banking Technology

Table 5.12 provides MSME informants' responses to the first set of ethnographic interview questions and detail-seeking probes of the form,

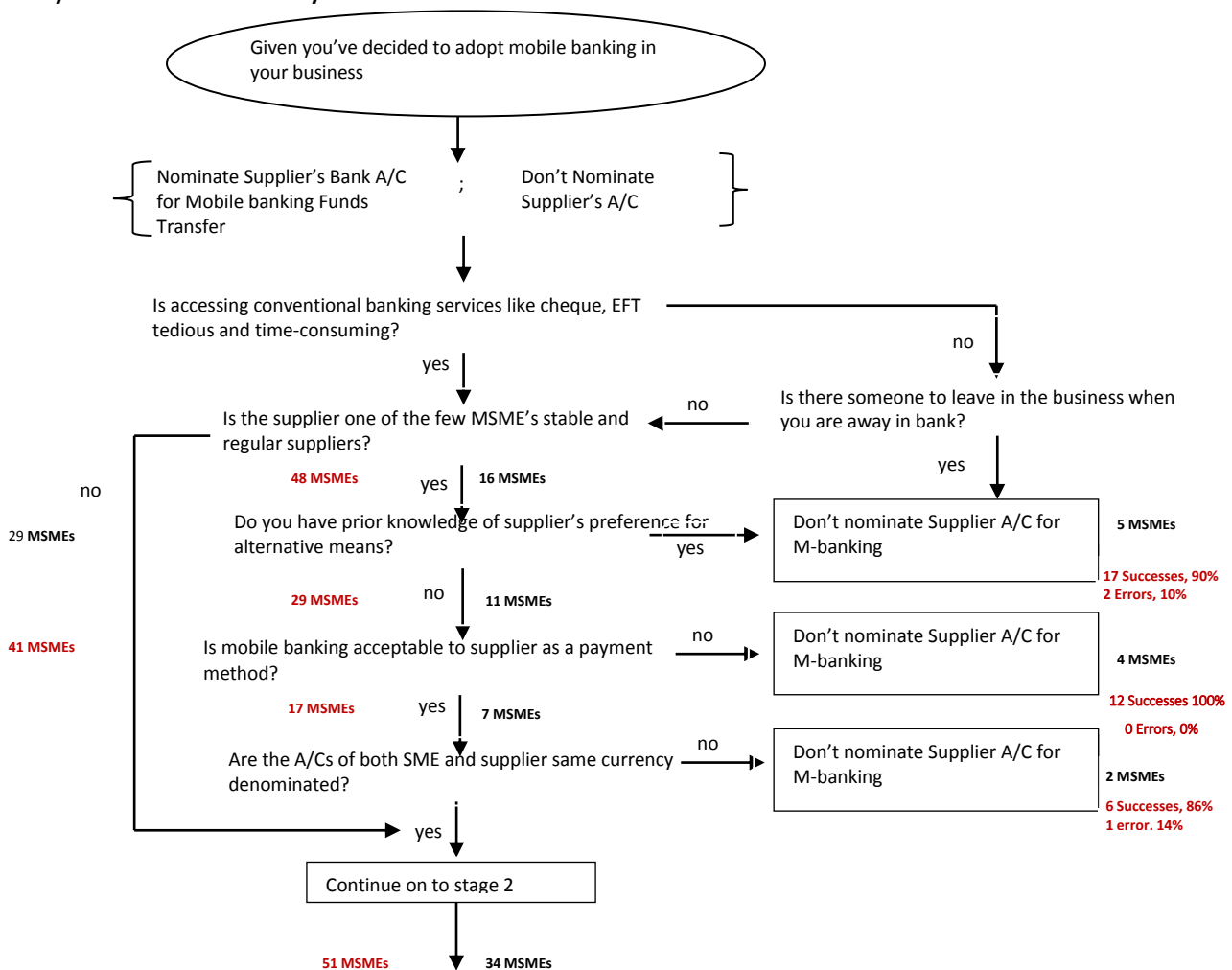
- (i) *"Have you ever paid a supplier through mobile banking system?"*
- (ii) *"Did you have access to different means of paying your suppliers?"*
- (iii) *"What made you to consider paying that particular supplier through mobile banking application yet there were other ways of doing it?"*

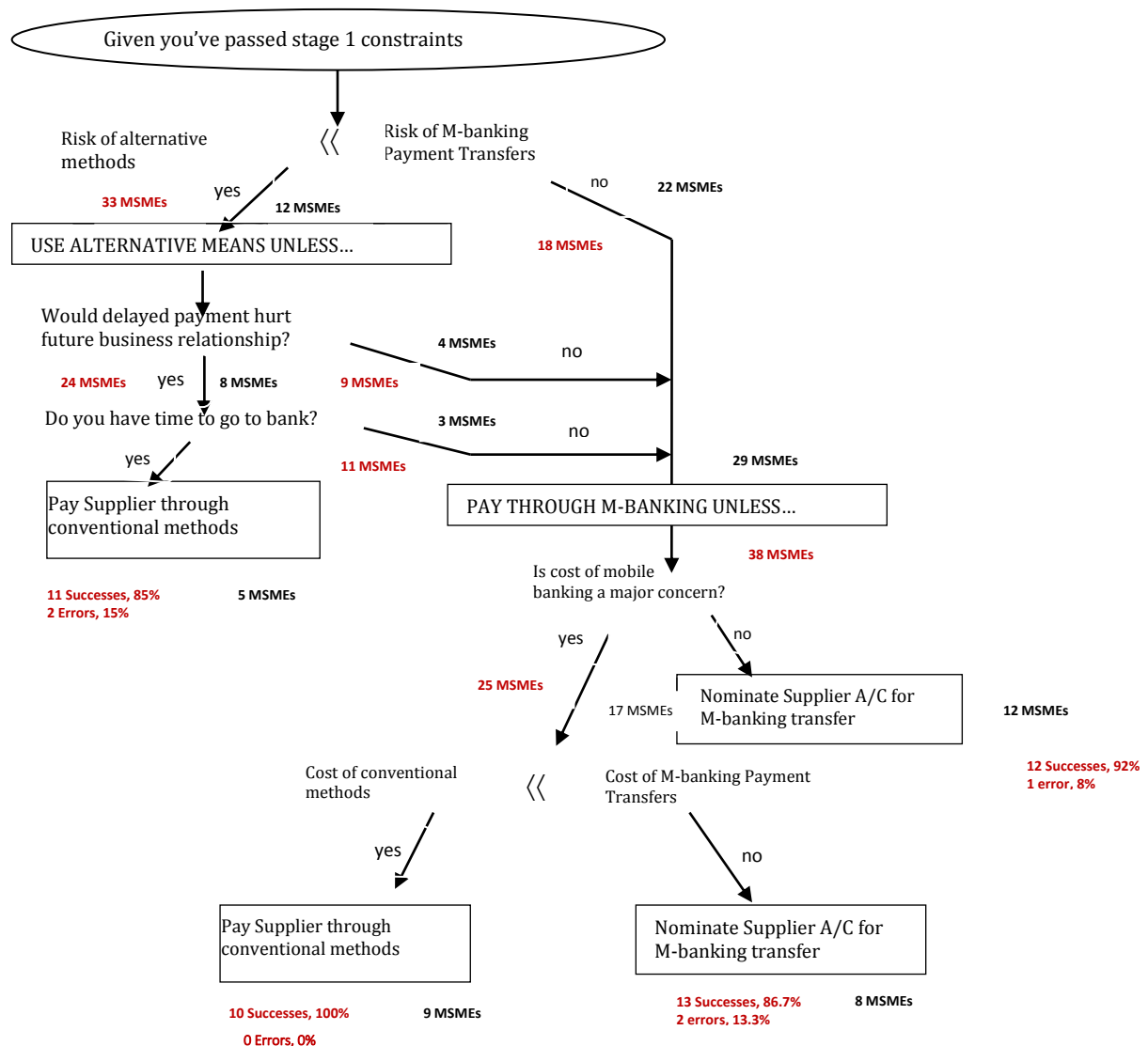
Table 5.12 MSMEs' Criteria for Deciding to Pay a Supplier through Mobile Banking: From Empirical Data

	MSMEs decision criteria for Choosing to Pay a Supplier through Mobile Banking System	Nature of choice criteria
1.	My business bank account is located far from our business location and going there to use conventional banking methods like cheques or electronic funds is tedious, time-consuming and expensive	Space and time Independence
2.	Delaying the payment would hurt our business relationship	Relational concerns
3.	I made a formal request and there was supplier acceptance of the mobile banking as a payment method	Supplier approval
4.	The amount owing to the supplier does not exceed the daily limit set by the bank for funds transfer. However we have had a few cases where the amount was much higher and we always ask if the supplier is okay with our multiple m-banking funds transfers taking place on different days to settle the debt owing to them.	Transactional amount is within externally set maximum
5.	I use mobile banking system to pay suppliers and other bills only when the cost of multiple m-banking funds transfers is less than the cost of other means of settling debit accounts such as cash, cheque, EFT, RTGS or money order.	Lower comparative cost
6.	Our business has few stable suppliers with whom we have long-standing business relationship	Supplier power
7.	Before using mobile banking to settle suppliers' debts or pay out any money I first check if a healthy financial statement is needed before any further payout transactions	Bank statement requirements. Informational checks
8.	We have already registered with the vendor some of our suppliers' bank accounts for mobile banking inter-account funds transfer. For those suppliers whose banks have not been nominated for m-banking funds transfer, we request if we can use mobile payment system such as M-PESA and include withdrawal or deposit fee on top of the amount owed. However the supplier has to express willingness to handle the bank account deposits later.	Pre-nominated supplier bank accounts. Supplier willing to accept mobile payment and deposit later to his bank account
9.	Our business is willing to pay the funds transfer charges involved. However those charges of transfer must be within the acceptable range	MSME's ability to pay transfer charges
10.	If there is need for filed evidence of supplier payment, then we use conventional banking methods especially cheques. In fact most suppliers prefer cheques or EFT	Requirements for filed payment evidence
11.	Some suppliers demand that we pay them before they deliver the stock to our premises and in such cases mobile banking is preferable because we don't have to wait for the cheque to clear. Its direct, it's instantaneous. It's faster.	Informational value
12.	The use of mobile banking is usually accepted by smaller business partners. Large corporates prefer traditional means such as cheque	Category and size of supplier business
13.	When I have prior knowledge of supplier's preference for cash I don't dare use mobile banking or mobile payment systems.	Supplier preferences
14.	Mobile banking system works well where both our bank account and the supplier bank account are denominated using same currency.	Same currency denomination
15.	I find using mobile banking very ideal where the foreseeable supply business relationship is long and also where past relationship has been cordial.	Foreseeable and past relations

Based on the MSME responses provided in table 5.12 above, the composite decision model shown in figure 5.14 was designed to represent the Kenyan MSMEs' decision to pay a supplier through a mobile banking system. From the model it is easy to see that many of the sampled MSMEs preferred the mobile banking payments because of such factors as convenience, time saving and not because of its less cost.

Figure 5.14 MSMEs' Composite Decision Model of the Choice to Pay a Supplier through Mobile Banking System: From EDTM Analysis





NB: Supplier Model Predictability = (successes/test sample)*100 = (81/89)*100 = 91.1%

5.4.4 Modeling Actual Usage Choices: MSMEs' Decision to Grant a Customer's Request for Mobile Banking Payment Option

Secondly it was empirically observed during the preliminary phase in which the initial decision to adopt or not adopt the mobile banking technology was modeled, that MSMEs only allowed some customers to pay for goods using mobile banking system and declined other customers' requests. The discriminating behaviour of MSMEs of granting some customers' mobile payment option request and declining others led to the modeling of the second decision namely, *'Whether or not to allow a customer to pay for goods through mobile banking system'*. Notably, mobile payment systems which are proprietary to certain mobile network operators are usually embedded as subsystems of the mobile banking system in the

Kenyan context. This unique design is illustrated by the user interface of one the mobile banking applications used in Kenya where M-PESA is provided as one of the application's menu options:

Welcome to Barclays Hello Money.
Select option

1. M-PESA
2. Airtime
3. Change PIN
4. Banking Services
5. Payments
6. A/C links
7. Options

The above design implies that if the customer's mobile payment request is granted, he or she transfers mobile money to the MSME operator's mobile phone money account, from where it is transferred into the MSME's bank account via mobile banking system. Every transfer incurs a set cost and time element. Besides, all sampled MSMEs clearly indicated their preference for cash but indicated that the mobile payment option request is evaluated on a case-by-case basis. From the foregoing, the *alternative* "Decline Customer's Mobile payment Request" is therefore equivalent to preferring a cash payment, while selecting the *alternative* "Accept Mobile Payment from Customer" represents the MSME operator's decision that precedes his or her choice to use m-banking system to deposit the amount after the sales transaction. MSME operators' responses were sought to a second set of ethnographic interview questions and detail-seeking probes of the form,

- (i) *"Have you ever encountered a customer requesting to be allowed to pay for services or goods through mobile banking system?"*
- (ii) *Do you always grant or always decline such requests*
- (iii) *"What factors do you consider when deciding to grant or deny a customer's request to pay through mobile banking system?"*
- (iv) *"Is mobile banking your preferred mode for your customers to use when settling their accounts?"*
- (v) *Given a choice would you ask a customer to use alternative means rather than mobile banking application?*

Table 5.13 presents informants' actual responses to the ethnographic interviews from which we extract the decision criteria underpinning the MSME operators' decision to allow a customer to pay for goods and or services through mobile banking.

Table 5.13 MSMEs' Decision Criteria for Granting a Customer's Mobile banking Payment Option Request

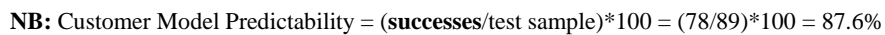
	MSME's Choice Criteria for Allowing a Customer to Pay through Mobile Payment System	Nature of choice criteria
1.	We allow some but not all customers to pay for the purchased item using mobile banking system. A few of our customers have nominated our bank account for m-banking funds transfer and we are okay with it. The process works when the customer is paying us in the currency of our business bank account.	SME payment mode policy Uniformity of currency used in MSME's and client's bank account
2.	In cases where the customer intends to use mobile payment system to transfer money to our mobile money account he or she has to add transfer and or withdrawal charges to the amount owing.	Willingness of customer to meet transfer charges
3.	I have a dedicated business phone that we use for m-banking transactions to help us with reconciliations. However we do not allow our customers to pay us large amounts using their cell phones because of the high risk involved. Even if you discover that you have been defrauded and you report the matter to authorities it takes a long time and money to resolve it. The mobile network or the bank takes long to print the statement as proof of fraud and only after you have obtained a court order. I want my customers to pay in cash wherever possible. It's not worth the trouble.	Value derived from transaction versus perceived risk
4.	It depends on whether the customer's request is made during peak hours when we have many customers or off-peak hours.	Peak versus off-peak requests
5.	The request is granted especially if there is an employee available to attend to the m-banking requesting customer. But if all my employees are busy, then the customer is asked to wait.	Availability of employee to attend to unique request
6.	When the request for mobile payment is made in the evening we are more likely to grant it since most mobile money transfer agents have closed and it's hard to load the cash into the business cell phone. He or she has to meet the transfer fees involved.	Availability of money transfer agents
7.	When I need cash to settle some bills, I usually direct the customer to a nearby mobile money transfer agent to get cash and pay for the goods bought. Some agree, some decline and insist they want to pay using mobile payment especially when they are in a hurry.	Customer's willingness to encash mobile money and pay in cash
8.	I find it easier to allow an existing and regular customer to use mobile banking to pay than a once-in-a-blue moon customer or completely new customer. A trusted customer can pay using any means including mobile banking, especially if he or she has been faithful and prompt in settling owing amounts in previous transactions. But of course we trust female customers more than male customers in mobile banking systems.	Regular and trusted customers versus new and unknown customers. Differing gender perceptions
9.	If the m-banking payment request option is only affecting the current transaction then it's easier to allow it. I prefer cash and do not want customers to get used to mobile payments because of cases of fraud.	Transactional value
10.	I am usually alone in the business except when my children are on holiday and that's why I prefer cash. Only in rare circumstances do I allow one or two customers to use that mobile -payment technology especially when I am less busy.	Transactional value
11.	I don't allow customers to pay through m-banking especially when I feel like there is risk associated with transacting with new customers. For regular customer's request it depends on whether the risk of using the technology is less than the risk of declining the m-banking request especially if there is substantial loss of business.	Transactional value
12.	Granting the request must not be an interruption of the normal flow of business.	Guaranteed continuity of normal

		operations
13.	I only allow a customer to pay through mobile banking system when I feel that declining his or her request for the option might negatively affect our future business relations. I do not want to lose a customer who is one of the few critical customers for my business because of a payment method. They say 'customer is king'.	Risk of possible loss of money through fraud is greater than the risk of declining client request
14.	We evaluate the merits of each mobile banking payment option request on a case by case basis to see if the reasons cited by the said customer are convincing. But that is only when the business context allows it, and especially when the customer is well known.	Reasons cited to support the customer's request for mobile payment

The tree model shown in figure 5.15 is a visual representation of the MSMEs' decision to allow a customer to settle bills through mobile banking.

89 Test MSMEs

NB: Model building Sample = 45 SMEs, Validation Sample size = 89



5.4.5 Conclusion

According to Gladwin (1989), the models shown in figures 5.12, 5.14 and 5.15 embody decision making algorithms that may be coded into executable programs and tested in future EDTM studies.

Chapter 6: Findings and Discussions**6.1 Introduction**

This chapter discusses the findings and makes inferences from the perspectives of Gladwin's (1989a) EDTM and Giddens' (1984) structuration theory.

6.2 The EDTM Perspectives

As Lave & March (1975) contend, a decision model is a simplified picture of a part of the real world and therefore presents only a subset of the characteristics of the envisaged reality. Arguably therefore, the three ethnographic decision tree models presented in Chapter 5 do not purport to offer a complete picture of all the phenomena present in the context in which Kenyan MSMEs adopt or fail to adopt mobile banking technology. Like other pictures, a model is much simpler than the phenomena it represents and explains and therefore it is the implications that make models useful (Lave & March, 1975).

6.2.1 Model 1: MSMEs' Mobile Banking Initial Adoption Decision

MSME informants' decision criteria in the initial adoption decision model (see figure 5.12), reveal a common perception that mobile banking is expensive and that their adoption choice is driven by non-pecuniary factors such as safety and security, convenience, accessibility, and the time-saving benefit which derive from the technology's ubiquitous nature. The pre-attentive phase reveals that MSMEs initially consider decision criteria such as owning a bank account, having many small payments such as utility bills to make, and pressure from their significant others such as distant customers and suppliers. This information could be used by banks to redesign their marketing strategies to make mobile banking technologies more appealing to their target customers. Mobile banking vendors should first and foremost aim at making the target customers open a bank account and market the ubiquitous service at the time of opening an account or when customers are paying utility bills over the counter. According to Gladwin (1989c), by the time designers introduce technological innovations potential adopters already have their own "survival strategies" which if determined a priori

could make development targeted through technology adoption more effective. The model further shows that MSMEs that are run by one person are most likely to adopt and use mobile banking to avoid closing the business when seeking conventional banking services to settle their payable accounts.

6.2.2 Model 2: MSMEs' Decision to Pay a Supplier through Mobile Banking

The model reveals that prior knowledge of a supplier's preference for conventional banking overrides any mobile banking benefits perceived by an MSME operator. In such cases an MSME does not nominate the supplier account and therefore automatically forfeits the perceived benefits. Despite the weight of the supplier preference, 46 MSMEs out of a test sample of 89 MSMEs however said they would nominate the supplier account for mobile banking payment option. The implication is that for a strategy that incorporates both MSMEs and suppliers is needed in order to increase the rate of mobile banking adoption. A top-down scan of the model also reveals that a decision to pay a supplier through mobile technology is influenced by an evaluation of such decision criteria as the time factor, supplier regularity and preference, currency denomination, impact of choice on business relationship, risk assessment, and cost. MSME Informant 5 response is a case in point

"I use mobile banking system to pay suppliers and other bills only when the cost of multiple mobile banking fund transfers is less than the cost of other means of settling debit accounts such as cash, cheque, electronic funds transfer, real time gross settlement or money order".

A decision to nominate accounts of non-regular suppliers was influenced more by perceived risk, time and cost saving factors while nomination of regular supplier accounts was influenced by supplier preference, currency denomination and the desire to sustain business relationships.

6.2.3 Model 3: MSMEs' Decision to Grant Customer's Request for Mobile Banking Payment Option

The 3rd model reveals that a decision to accept a mobile payment from a customer is influenced more by existing payment policies, trust structures, prior-nomination of MSME account for mobile funds transfer, perceived risk, and customer's readiness to meet the

attendant money transfer charges, and the timing of the request. 12 MSMEs said they would decline customer request given their cash payment policy.

6.3 Structural Perspectives

The design of regulatory frameworks may be hampered since MSMEs, banks, technology vendors and designers, mobile network operators (MNOs) and regulatory agencies, as the social actors involved in the mobile banking service interactions are not co-located. That is, they operate in non-contiguous organizational contexts made up of varying organizational structures, lifeworlds and work practices and also pursue heterogeneous interests that render the construction of shared meanings difficult (Bjørn & Ngwenyama, 2009). Although the actors operate in different organizational contexts, their interactions however constitute a virtual order of relatively autonomous and interdependent social relations, practices and activities that may potentially blur the translucence aspects of visibility, awareness, and accountability required in resolving mobile banking service related problems (Bjørn & Ngwenyama, 2009). For instance, consider a scenario where an MSME operator initiates a mobile banking transaction to deposit the day's proceeds and is immediately charged the network connection and usage fee from the airtime by the mobile network operator (MNO) but ultimately fails to access the desired mobile banking service. When he or she contacts the customer care desk of the MNO, she is referred to her bank in the pretext that the MNO does not deal in banking services but only provides the network infrastructure on which the bank deploys the mobile banking application. This is illustrative of a lack of a shared meaning context or a deficient background knowledge used by the social actors to organize and shape the interpretation of events within their social system (Daft & Weick, 1984; Schein, 1992). Although mobile banking provides the technology mediation for MSMEs to access financial services collaboratively, issues of shared meanings and consumer protection remain pivotal (Bjørn & Ngwenyama, 2009). This study therefore argues that in order to protect mobile banking technology consumers a clear intervention programme should be designed to include a log file where consumers' suggestions and complaints may be lodged via an SMS, and later used by designers and vendors to customize the IT artifact.

6.3.1 Structural perspectives: Time space distancing

Mobile banking technology is ubiquitous and therefore supports reciprocity of banking service-oriented practices between human and institutional actors who operate in differing time-spaces (Jones & Karsten, 2008). The resulting system integration gives rise to relations of autonomy and dependence that minimally accommodate but differ from the relations of co-presence (Boudreau & Robey, 2005). For instance, MSME's cash withdrawal and registration for mobile banking service over the bank's counter, replacing a SIM card when a cell phone is lost or stolen, depositing or withdrawing cash at a mobile-money transfer agent's shop, purchasing airtime out of which the network connection and usage fee is paid to access mobile banking application etc., are all forms of face-to-face interaction between the social actors in a context of co-presence with bank tellers, air time resellers, and mobile money agents etc. (Giddens, 1990b). Such forms of social integration are indispensable and are mediated using rigid self-identification mechanisms such as presentation of valid identification cards and passports which, being material reify the structural properties of the social system such as physical authentication of bank customers (Stones, 2005; Walsham & Chun-Kwong, 1991).

With the technology mediation of mobile banking, the user is only required to type a secret personal PIN that is uniquely tied to his or her SIM card number, both of which are used to authenticate the customer's identification information that was captured during registration in a previous time-space context (Sahay, 1997). Technology mediation using money as a "symbolic token" differs from the face-to-face or social integration where the interaction involves co-location, in that the service seeking actor such as the MSME operator, as a knowledgeable agent is required to reflexively monitor the coded responses of the mobile banking application provided in the form of menu options using structures of signification, that reify the banking service rules and resources deemed to exist only in the mind of the bank tellers as 'mental traces' (Jones & Karsten, 2008, p. 134). In his structuration theory, Giddens (1984, p. 21, 82ff) offers two concepts namely, the "symbolic tokens" and "expert systems" as two "dis-embedding mechanisms" which social science researchers may employ to show that it is possible to 'dis-embed' or lift social relations out of local contexts of interaction and restructure them across extended spans of time-space, a theoretical concept that Jones &

Karsten (2008) describe as helpful to investigate the relationship of individuals in a banking application. For instance, the relation established between the MSME and the bank in a 'context of co-location' when registering for mobile banking service, may be restructured by adding more bank accounts in future time-space contexts in order to expand the transactional functionality for the business (Sahay, 1997).

Accordingly, the real and material aspects of mobile banking, argues this thesis, do not embody but rather reify or objectify the social structure that is both the medium and outcome of the social practices of actors involved including MSMEs as service users, MNOs as providers of mobile network infrastructure and banks as mobile banking vendors. This view is consistent with that of Stones (2005), who while taking issue with Archer's (1995) claim about the 'error of conflating' structure and agency, follows Giddens (1984, p. 177) in acknowledging the existence of both 'virtual internal' and 'objective external' structures where the former is seen as mediating the social action for purposes of structuration (Jones & Karsten, 2008). Stones (2005) takes issue with Archer's (1995) morphogenetic/ morphostatic approach, a realist's view in which the society is said to pre-exist the social actor, as being born out of a failure to accept Giddens's (1984) own account in which the latter argues that the actions that constitute agency in structuration theory are executed within a "context that limits the range of options" open to the social actors (Jones & Karsten, p. 132).

6.3.2 Structural perspectives: Social Structures and Social Relations

Examples of internal social structures identified in relation to the Kenyan MSMEs usage of mobile banking include: the mobile termination rates (the fee charged to connect to another mobile network) (Binmore & Harbord, 2005), mobile-money transfer tariffs such as M-PESA charges, commissions paid by banks to mobile network companies for using their network to deploy mobile banking applications. These charges were found to influence the MSMEs decision to adopt the mobile banking technology because they cumulatively determine the service fee levied by the banks to customers (see figure 5.11). One empirical observation is that the MSME operator is required to list in advance the bank accounts of MSME's suppliers and customers with the service vending bank, in order to facilitate future transfer of mobile funds or payments. From the vantage point of structuration, this study argues that the

MSME's prior specification of the business partners' accounts is a good example of time-space distancing of social practices since the action in itself limits the number of suppliers and customers that an MSME can directly pay or be paid by through the mobile banking system in future time spaces (cf. Jones & Karsten, 2008; Sahay, 1997).

Moreover, the requirement for the MSME operator to physically walk into a bank and register in order to access and use mobile banking service during future transactions signifies a form of "dis-embedding" of vital social relations from one time-space context so as to enable and shape those relations of extended time-space (Sahay, 1997; Schultze & Orlikowski, 2004). For instance the future transactional interactions between MSME and its suppliers/customers depend on the initial and or previous exchanges between the MSME and the bank. This argument reinforces the view that reciprocity of ICT-related social relations and social practices in social integration are rudimentary to those of the system (Giddens, 1984). For example, the interviewed informants pointed out that the loss and or lack of physical identification documents 'today' restrains the MSME operator from accessing the conventional banking service in the 'future', a constraint overcome by mobile banking adoption and usage, with the unintended consequence that an impostor may impersonate the MSME owner and access mobile banking account using stolen digital identity (Bhattacharyya & Sivanand, 2011). A few MSMEs indicated their preference for 'over-the-counter' cash transactions in situations of co-presence, which is a form of social integration that is, the "systemness on the level of face-to-face interaction" of co-present social actors (MSME owner and bank teller) which requires rigid self-identification mechanisms such as flashing out national identification card or passport (cf. Giddens 1979, p. 76).

Mobile banking objectifies a social system that facilitates both social and system integration among the social actors (Jones & Karsten, 2008). Theft of MSME operator's digital identity, described by some of MSME operators interviewed as a "rather dreaded experience", is presumably critical when viewed from the perspective of system integration, that is, "connections with those who are physically absent in time or space", where in the context of this study, mobile-banking solution establishes "systemness on the level of relations between social systems or collectivities" (Jones & Karsten, 2008, p. 133). System integration through

usage of mobile banking technology implies that MSMEs are able to interact with banks and MNOs and transact with suppliers, customers, landlords and landladies and pay their bills by simply providing their digital identity in the form of a secret personal identification number (PIN) (Boudreau & Robey, 2005).

6.3.3 Structural perspectives: Discursive vs. Practical Consciousness

The desirable and undesirable aspects of MSMEs' socialization and learning experiences when using mobile banking, such as loss of money through cyberspace fraud, loss or saving of time and more efficiency in business operations, are all forms of actor's discursive and practical consciousness that shape both the present and future mobile banking usage decisions (Giddens, 1990b). Although central banks in Sub-Saharan Africa had initially considered mobile banking simply as deployment of conventional banking services over a different channel or cell phone, they are increasingly acknowledging that the innovation poses serious challenges to both banks and service consumers including but not limited to money laundering, fraudulent transactions, reputational risks, valuation challenges, difficulties in managing currency in circulation, confidentiality versus transparency challenges, accounting framework challenges and harmonization, as well as challenges relating to corporate governance, risk management and compliance functions (Slewe & Hoogenboom, 2004; Goodman & Harris, 2010; Luo et al., 2010; Deloitte, 2011). Accordingly, the use of structuration theory as the grounding theoretical framework, and ethnographic decision tree modeling (EDTM) as the empirical approach to execute the research, has enabled this thesis study to conceptualize mobile banking IT artifact as interconnecting several relatively 'autonomous and dependent' social relations such as MSME-bank, MSME-MNO, MSME-MMTA, MSME-client/supplier, and Bank-MNO interactions (Giddens, 1984; Gladwin, 1989a; Schultze & Orlikowski, 2004).

From the foregoing, we can therefore argue that the functionality and thus the capability of mobile banking technology to meet the business needs of MSMEs, depends on the rules and resources described by Giddens (1984) as the 'structural properties' occasioned by the nature of its design and deployment. Therefore the MSME's decision to register for and or not use

mobile banking technology to enact business transactions, is contingent upon the outcome of evaluating several reciprocal practices of many human and institutional actors.

6.3.4 Structures of Signification in the Research Context

When designing the mobile banking application, banks and MNOs as joint vendors use language to incorporate user menu options that constitute structures of signification mediated through interpretive schemes to facilitate communication and effective service usage. Some MSMEs indicated that they do not understand some options and therefore hardly use them. This is a pointer to a need for vendors of ICTs meant for the public space to rethink training, since mobile banking application unlike other ICTs meant for use within an organization is not targeted to a few people who are easy to train under one roof. For example, mobile banking application designers may consider including a light tour guide module accessible via the first menu option. Arguably, the MSME operators' understanding and interpretation of the language used in built-in menus may boost or hamper effective access to and usage of the mobile banking IT artifact in their businesses. The interpretation occurs in the mind of the technology adopter and is therefore a critical structural property of the abstract social structure formed by the interacting actors brought together by the mobile banking (Lyytinen & Ngwenyama, 1992). Presumably, mobile network operators (MNOs) and banks too have to interpret the regulatory rules designed by regulators of banking and finance as well as telecommunications sectors for proper compliance to be enforced. For instance they have to interpret policy framework related to setting a ceiling on the amount of mobile-money transfer per transaction in order to prevent cases of fraud, money laundering, and also in applying the mobile termination rate (MTR) to facilitate fair play among the MNOs in a country (Binmore & Harbord, 2005; Valletti, 2006).

6.3.5 Structures of Domination in the Research Context

Mobile telecommunication firms provide the mobile network on which banks deploy mobile banking applications and also set network usage tariffs and or commissions that are usually pushed on to the technology consumers including MSMEs and individual users. Banks on the other hand set up a service usage charge further born by the consumers of mobile banking technology. However, on both instances, MSMEs as target consumers are not involved in

setting service tariffs and commissions. Thus the social practices of MNOs and banks enact structures of domination in Kenya's mobile banking platform (Giddens, 1984). And as one MSME owner manager lamented,

"Providers do not disclose but keep the charges hidden...I only see them when I request for the bank statement and they are extremely high. In fact I don't use mobile banking because it's cheap but because it is convenient and I run my business alone".

A dialectic of control among the actors in a mobile banking social system is also evident. For instance, MSME operators have to voluntarily purchase and load airtime into their cell phones in order to access the mobile banking service. Giddens (1984), while holding that resources are the media through which power is exercised, posits,

"We should not conceive of the structures of domination built into social institutions as in some way grinding out 'docile bodies' who behave like the automata suggested by objectivist social science" (p. 16)

Although incentives such as low tariffs and commissions, mobile network technology, float or mobile-money held by transfer agents, registration of transfer agents, and advertising and training materials are resources used by banks and mobile network operators to exercise power over mobile banking service consumers, MSMEs as well as individual users use resources such as voluntary purchase of airtime, voluntary opening of bank accounts, voluntary enquiries and voluntary usage in a way that embodies the dialectic of control in the envisaged mobile banking social system (Giddens, 1984). Giddens (1984) further postulates that *"all forms of dependence offer some resources whereby those who are subordinate can influence the activities of their superiors"*. For example, MSMEs as consumers of mobile banking service in Kenya wield the power of 'choice' among available alternative methods of transacting, by which they can compel the service vendors to revise tariffs downwards or increase the number of incentives (Schellhammer, 2010; Verbeek, 2005).

For some banks, inter-bank account mobile funds transfer is not automatic as it requires additional information such as the inclusion of the recipient's bank account in the MSME's mobile banking arrangement. This form of restructuring of pre-existing social relations between the MSME and the bank across time-spaces, may presumably be seen as a form of domination by the mobile banking vendors and designers with potential to create unacknowledged conditions that prompt unintended MSME switch to rival providers that permit both inter-account and inter-bank account mobile-money transfer (Schellhammer, 2010; Verbeek, 2005).

6.3.6 Structures of Legitimation in the Research Context

Mobile banking technology vendors generate an initial service access PIN and send it via SMS to the target adopter with timed instructions on how to customize and keep the PIN confidential, which is a structure of legitimation (Jones & Karsten, 2008). It must be pointed out that the PIN is linked to personal details such as digital face image and or biometric fingerprints, residence, address, national identification number and other personal information that is captured through reciprocal social practices between the MSME operator and the bank representative in situations of co-presence (Jones & Karsten, 2008). Such personal identification information is used to authenticate the MSME owner or service consumer in enacting future transactions in a manner that brings to the fore the role of structuration concepts of time-space distanciation and system integration in the execution of mobile banking transactions (Boudreau & Robey, 2005; Ikeya, 2003).

6.4 Unintended Consequences Unearthed

MSMEs underscored their greatest fear as loss of money through fraud related to mobile banking transactions since any attempt to recover the loss triggered costly, protracted and complex legal tussles that made some MSME operators to abandon the legal pursuit (Molony, 2007; Morawczynski & Miscione, 2008). Thus there is a need to reorient the country's justice system to be able to address mobile-banking fraud. Loss of business time was also cited as critical by MSME owners or managers who operate their businesses alone or single handed. For example, some operators cited the inconvenience of having to go to a money agent to deposit the business proceeds leaving their small businesses closed. Perhaps in such cases, the

banks and mobile network operators may design mutually beneficial incentives where businesses could register for low-fee transactions both to encourage mobile banking usage and to enhance financial inclusion of the poor persons as part of their corporate social responsibility (Santana & Wood, 2009). Additionally, an honest customer may erroneously and unintentionally send an amount exceeding the stock item's price to the MSME operator's phone, and distract the latter from serving waiting customers when trying to reverse the transaction. The distraction of the MSME owner, the interruption of the normal flow of business, and higher transaction fee involved in the reversal process are all unintended consequences of mobile money transaction that is in itself intentional

In addition, the usage of mobile banking IT artifact has also created novel business opportunities. For example, some MSMEs hire at commission individuals who are not employees to take and deposit the business proceeds with the money agents, or ask the money agents to collect the proceeds and deposit into the business operator's mobile-money account at a commission (Figure 5.2.2). While providing a fast, easy and secure access to MSME's bank account is the intentional action within the envisaged structuration in the research context of MNOs and banks, the mobile banking service itself, claimed some informants also triggers impulse withdrawals and spending that is unrelated to business operations thus running the risk of depleting MSMEs' savings and capital base, which runs counter to the government's socio-economic empowerment agenda and revenue growth plans, an outcome albeit unintended (Jones & Karsten, 2008). To forestall these retrogressive tendencies, the government could partner with banks and micro-finance institutions to provide business and financial management training programmes to MSMEs at a small fee in order to build capacity in them to grow their businesses so that they may contribute to national revenue. Some informants indicated that the deployment of the mobile banking service over networks owned by telecommunications firms necessitates payment of two service levies namely the MNO's infrastructural fee (deducted before mobile banking service is offered usually from airtime) and mobile banking transaction charge (deducted from MSME bank account). The high charges create usage disillusionment unintended by the mobile banking designers and vendors whose intention is to create acknowledged conditions for mutual monetary benefit to participating actors. But high usage disillusionment may trigger a preference by MSMEs for

the expensive, inconvenient conventional banking techniques such as automated teller machines or over-the-counter transactions, thereby worsening the problem of financial exclusion among the micro enterprises (Rhine & Greene, 2006; Duncombe & Boateng, 2009).

Moreover, the seemingly permissive regulation adopted by Kenya's Central bank has arguably created a platform on which MNOs and financial institutions have come up with several mobile-money innovations, with some having the functionality to save and borrow against mobile money account balance. As a result, Kenya's mobile banking platform might be seen as having created stiff competition among providers thus lowering service charges. For instance, some MNOs have lowered their calling charges or replaced the per-minute to per-second billing scheme in order to retain their subscribers and lock them to their proprietary mobile-money transfer services at competitive prices. By doing so, banks and MNOs arguably contribute to the realisation of financial inclusion, which is cited as a key intended consequence of the mobile banking technologies (Donner & Tellez, 2008; Duncombe & Boateng, 2009).

6.5 Theoretical Elaborations

As an inductive technique, EDTM begins with detailed observations of the world from which patterns are derived to support development of predictive-explanatory theories for those patterns through a series of hypotheses towards the end of the study (Bernard, 2011; Goddard & Melville, 2003; Bailey & Ngwenyama, 2013). Deriving propositions from ethnographic decision tree models is demonstrated in literature (Bailey & Ngwenyama, 2013). Propositions derived from the decision models are hereby presented in section 6.6.

6.5.1 Concepts Derived from the Initial Adoption Model (Figure 5.12)

Time saving, supplier preference, risk reduction, and business relationship are more significant decision criteria than the cost aspect when an MSME decides to pay to a supplier through mobile banking. For example 52% of the MSMEs said they would use the technology despite its higher charges. Analysis of the empirically derived decision criteria along the decision model paths shows that MSMEs' behavioral decision to adopt mobile banking initially is initially driven by such criteria as: *knowledge of mobile banking business*

advantage, trust structure, external influence, social ties of MSME operator, pursuit of self-empowerment, perceived security, service reliability, pressure and stories from partners, business continuity and simplicity of transactional procedure.

6.5.2 Concepts Derived from Supplier Payment Decision Model (Figure 5.14)

MSMEs' decision to pay a supplier through mobile banking is influenced by such criteria as *existing business policy, social capital, timing of customer's request, staffing structure, perceived need for business cash, and perceived risk.*

6.5.3 Concepts Derived from Customer M-Banking Request Model (Figure 5.15)

MSMEs' decision to grant a customer's mobile banking payment request is influenced by such criteria as *existing business policy, social capital, timing of customer's request, staffing structure, perceived need for business cash, and perceived risk.* Social capital and trust networks, risk amount, future business are more significant factors than incidental costs when MSMEs decide to grant a customer's mobile banking payment request (Molony, 2007).

Figure 6.1 graphically represents the interplay between the empirically derived decision criteria, the mapped theoretical concepts, behavioral intention to use, actual use and usage consequences.

6.5.4 Mapping Decision Criteria to Concepts and Consequences

Empirical data from EDTM as provided in tables 5.9, 5.10, 5.12, 5.13 and from decision models shown in figures 5.12, 5.14 and 5.15 provide the decision criteria that are mapped into theoretical concepts as depicted in figure 6.1 below and in figure 6.2 further ahead. Technology usage consequences may be designed or emergent and they modify MSMEs' behavioral intention to adopt as well as their usage of technology. Emergent outcomes were obtained by asking Question 28 in the interview protocol (see appendix II) regarding the key challenges MSMEs had encountered while using mobile banking.

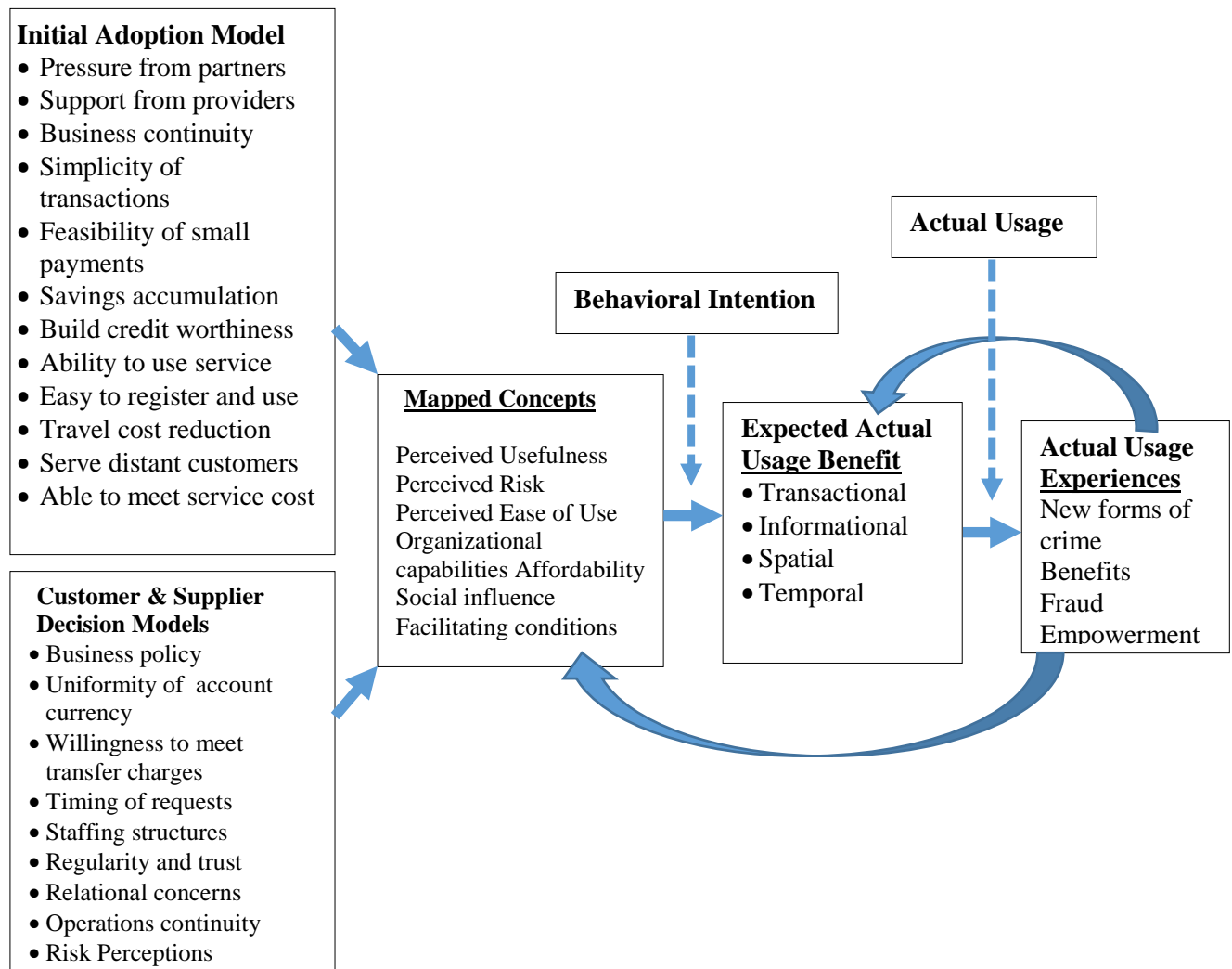
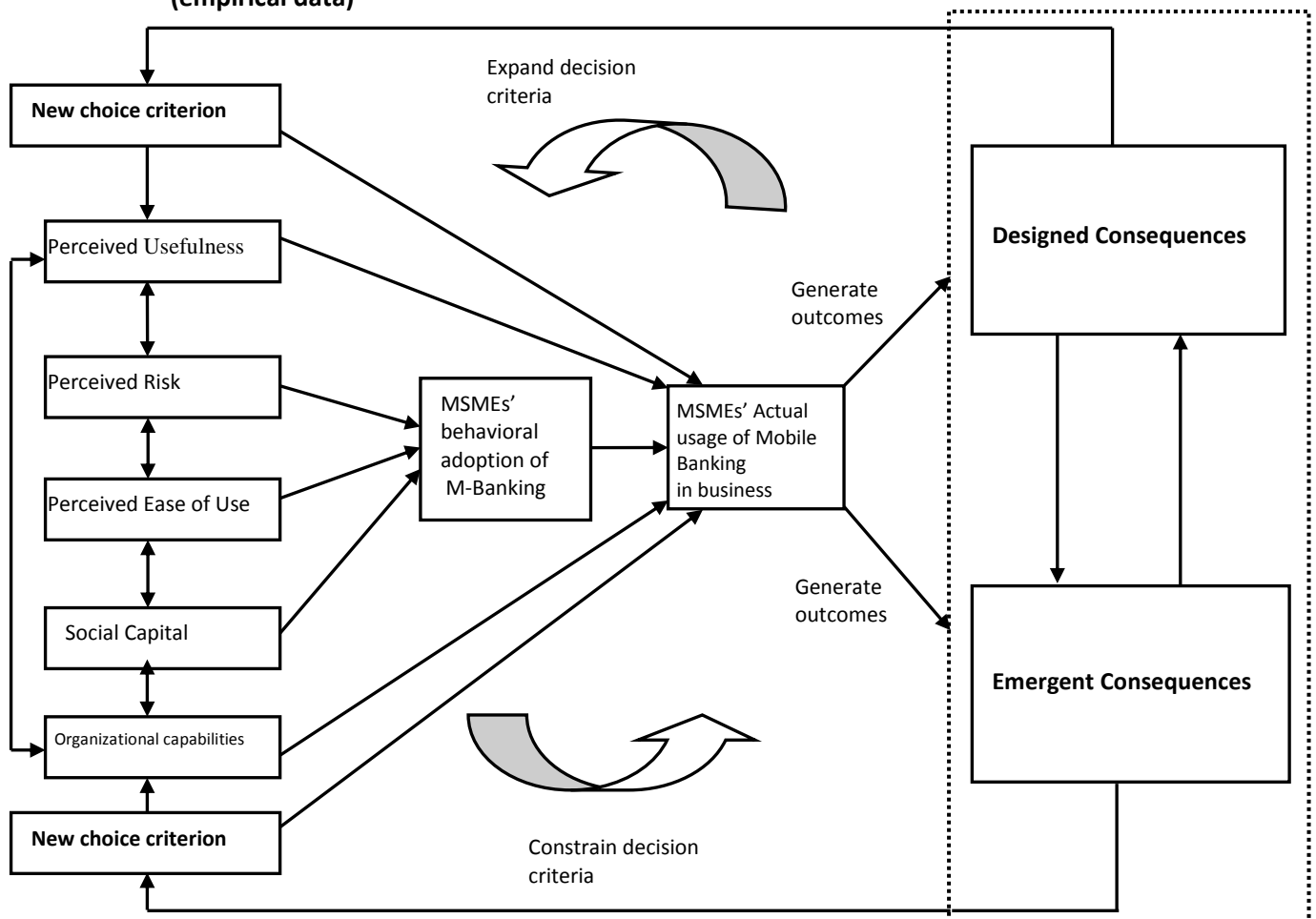


Figure 6.1 Mapping Decision Criteria into Concepts (Empirical Data)

6.6 Theoretical Model Derived from Decision Criteria and Resulting Consequences

The goal of this study is to provide an understanding of MSMEs' mobile banking adoption decisions and how the usage consequences influence subsequent usage decisions. EDTM is an inductive approach seen as a complete reversal of deductive research since no hypotheses are offered at the beginning of the study (Lancaster, 1966). Although EDTM starts with detailed observations of the context and translates to more abstract generalizations and constructs, the researcher is unsure of the nature and character of findings until the investigation is completed (Goddard & Melville, 2004). Figure 6.2 is a theoretical model to graphically depict the interplay between the key concepts (see figure 6.1) derived from the empirically obtained decision criteria.

Figure 6.2 Theoretical Model Derived from Decision Criteria and Usage Consequences (empirical data)



6.6.1 Perceived Usefulness

Perceived usefulness is the potential adopter's subjective probability that using a given IT artifact will increase his or her performance in an organizational context (Davis, Bagozzi & Warshaw, 1989, p. 986). Perceived usefulness is also described as 'perceived benefits or "relative advantage" (Taylor & Todd, 1995). The initial adoption decision model shown in figure 5.12 reveals that most MSMEs adopt mobile banking out of a perception that its use will result in ubiquitous access and tracking of business financial transactions; the ability to deposit little proceeds on a daily basis and gradually accumulate huge savings. For some informants, adopting mobile banking was seen as acquiring a means of building a credit worthiness profile through regular savings to help them access financing later. Other benefits cited by MSMES were electronic funds transfer, being able to operate a business alone and bill payment as evidenced by the following interview response,

"This service is like having a bank in the pocket all the time. It gives me access to more sophisticated banking services over and above deposit and withdrawal services for the business. I can pay bills of water, electricity, and rent. For us it is a one-stop financial shop". [Table 5.9]

The three adoption models presented in figures 5.1 shows that MSMEs adopt mobile banking service if they perceive it as likely to save business time, increase productivity, or enhance effectiveness. This study thus hypothesizes that,

P1: The greater the perception of usefulness of mobile banking by MSMEs the greater the likelihood that they will adopt it.

Perceived usefulness has been identified as an important determinant of mobile banking adoption (Brown et al. 2003; Henderson & Divett, 2003; Luarn & Lin, 2005). Benefits of mobile banking to MSMEs include lower transaction costs, increased internal efficiency, location-free access, improved relations with business partners, improved competitiveness, and better quality of information (MacGregor et., 1998; Riyadh, Akter & Islam, 2009; Aboelmaged & Gebba, 2013). The positive influence of perceived usefulness on SMEs' intention to adopt mobile banking adoption is also supported in literature (Mbogo, 2010; Abukhzam & Lee, 2010).

6.6.2 Perceived Risk

Perceived risk is the subjective anticipation of incurring a loss in the cause of pursuing a desired outcome (Luo et al., 2010). The extent to which a technology is believed to be devoid of security and privacy loopholes determines its perceived credibility in the eyes of those expected to adopt and use it (Laforet & Li, 2005). The customer decision model shown on figure 5.15 with a predictability rate of 87.6% reveals that whenever 11(38%) out of 29 MSMEs considered a high amount risky to be paid through mobile banking. From the initial adoption decision model in figure 5.12, we deduce that some MSMEs prefer using physical receipts stored in a file for the inventory management and sales reconciliations over scrolling through mobile banking SMSs, citing such reasons as the possibility of a cell phone getting lost with all the business sales SMSs. Table 5.10 highlights the risks cited by interviewed MSMEs for not registering for mobile banking. The two direct responses below underscore the influence of perceived risk as a determinant of adoption of mobile banking among Kenyan MSMEs.

“I fear the fraudsters, what if I receive a mobile payment from a distant customer and dispatch the goods and then he or she calls the network’s customer care center purporting to have sent the money to the wrong number and blocks me from withdrawing the money” [Table 5.10].

“What if thieves gain access to my phone and coerce me to disclose my mobile banking PIN” [Table 5.10].

Therefore, this research adopts perceived risk as a construct in the adoption and usage of mobile banking. MSMEs’ perceptions of uncertainty in financial services, performance, and confidentiality are possible barriers to mobile banking adoption (Brown et al., 2003). In figure 5.14, 33 (64%) out of 51 MSMEs in the test sample considered the risk of paying a supplier through mobile banking higher than that of using alternative means. Accepting mobile banking payments from distant and unknown customers was viewed as risky. Adoption of mobile banking was perceived as enabling MSMEs to secure daily proceeds through direct deposits while use of electronic money was seen as eradicating the fear of fake currency inherent in cash transactions [Figure 5.12]. In Table 5.13(11) we encounter an MSME operator who does not allow customers to pay through mobile banking because of the risk associated with transacting with new customers. The MSME also weighs the risk of granting

a regular customer's request against the risk of declining the mobile banking payment request and only grants it when substantial loss of business is imminent. This study therefore proposes,

P2: A higher perceived risk will negatively impact the MSMEs' behavioral intention to adopt and use mobile banking.

Suoranta & Mattila (2004) found perceived risk as an important barrier to the adoption of mobile banking while Laforeti & Li (2005) argue that security is a key factor motivating mobile banking adoption. Although it is difficult to objectively assess perceived risk owing to its multi-faceted character, Riyadh, Akter & Islam (2009) contend that risk itself is at the centre of all financial transactions and that it may lead to loss of funds and performance degradation. Absence of confidence, reliability, security, and privacy aspects are major concerns of mobile banking users (Donner & Tellez, 2008). Mobile network downtime and malfunctioning of software and hardware components may increase risk perception and cause security concerns that negatively impact on a potential user's attitude and subsequent intention to adopt mobile banking (Suoranta & Mattila, 2004). Wang et al., (2003) found out that a higher perception of risk may deplete perceived credibility which is a key determining factor in internet banking adoption.

6.6.3 Social Capital

Social capital refers to the 'networks that have shared norms, values and understandings that facilitate co-operation within or among groups' (Riyadh, Akter & Islam, 2009). Elsewhere social capital is described as a resource that comprises trust and networks that be drawn upon when need arises (Molony, 2007, Coleman, 1988). The influence of social capital on the decision to adopt mobile banking is seen in the empirical data collected. For instance, MSMEs that had a primary preference for cash-based transactions reported adopting mobile banking as a result of mounting pressure from distant customers and other business partners. This is evident from in the direct empirical quotes provided below.

“Although I prefer cash payments, I received a lot of requests from distant customers who want to pay from where they are and goods sent to them”
[Table 5.9].

The customer model presented in Figure 5.15 reveals that 13 (52%) out of 25 MSMEs in the study sample adopted mobile banking since declining a customer’s request would adversely hurt future business relationship. Based on the foregoing discussion this thesis proposes that,

P3: An increase in social capital will positively impact MSMEs’ behavioral intention to adopt and use mobile banking.

According to Organisation for Economic Co-operation and Development (OECD), social capital takes three forms namely,

- (i) Bonds: Links to people based on a sense of common identity; (“people like us”) such as family, close friends and people who share our culture or ethnicity.
- (ii) Bridges: Links that stretch beyond a shared sense of identity, for example to distant friends, colleagues and associates.
- (iii) Linkages: Links to people or groups further up or lower down the social ladder

According to Donner (2007), the above networks drive business and other forms of voluntary interaction. Sampled MSMEs cited regularity and fore knowledge of customers as well as existing trust structures as critical when making a decision to allow a customer to pay through mobile banking [Table 5.13 (11-12)]. Social capital provides the links, shared values and understandings in social relations and social structures that enable individuals and groups to trust each other and work together (Coleman, 1988). MSMEs’ decision to adopt and use mobile banking involves an evaluation of roles of multiple social entities including customers, suppliers, banks and MNOs and agents. Shared norms, values and understandings are the glue that holds together the social networks that provide the operating framework (Molony, 2007). As Donner (2007) argues, social capital provides a platform on which suppliers extend informal credit to customers through mobile banking. Thus, social capital is perceived in extant literature as the resources available in and through the ideas, leads, business opportunities, financial capital, power and influence, emotional support, goodwill, trust and cooperation among the parties involved in a transaction (Coleman, 1988). Resources

reside in networks of relationships hence the word ‘social’ in social capital implying that these resources are not personal assets and that no single person owns them (Molony, 2007).

6.6.4 Perceived Ease of Use

Perceived ease of use is defined in literature as the extent to which usage is believed to be effort-free (David, 1989). Mobile banking was perceived by some of the sampled MSMEs as an easy means of making small payments that required no formalities [Table 5.9]. Table 5.9 provides the following relevant quotes:

“Mobile banking gives me easy access and allows me to track my bank account transactions, otherwise how will I know when things go wrong?”

“I find the service quite helpful because I can make quick small payments to the people who design and distribute advertising fliers for my business”

“I find mobile banking services easier to access and use than physically going to the bank every time I need money for business as I did before”

The initial effort-free registration of mobile banking compared with conventional banking method and its ability to simplify financial transactions emerged as an important decision criteria in the initial adoption. The above empirical observations lead the following proposition,

P4: The greater the perceived ease of use the greater the likelihood that MSMEs will adopt and use mobile banking.

Perceived ease of use influences perceived usefulness and as Venkatesh (2000) contends may have a positive effect on the target users’ behavioral intention to adopt mobile banking. This view is further reinforced by Aboelmaged & Gebba (2013) who find perceived ease of use having a positive influence on mobile banking adoption.

6.6.5 Organizational Capabilities

For MSMEs run by one person singlehandedly mobile banking may offer effective business management through ubiquitous access to banking services (Riyadh, Akter & Islam, 2009). Organizational capabilities may take different forms such as human capital, IT literacy, and resources. In the customer request decision model, 14 MSMEs decline mobile banking

payment option requests on the grounds that there is no employee available to attend to the unique payment option request since everyone is busy handling cash customers [Figure 5.15]. The importance of internal capabilities as a determinant of mobile banking adoption is underscored by the two empirical quotes below,

“I run my business singlehandedly and I hardly have time to step out to go and queue in a banking hall”. [Table 5.9]

“I am usually alone in the business except when my children are on holiday and that’s why I prefer cash. Only in rare circumstances do I allow one or two customers to use that mobile banking technology especially when I am less busy”. [Table 5.13]

The above empirical observations are the grounds for the following proposition,

P5: Organizational capabilities will have a positive influence on MSMEs’ adoption and actual usage of mobile banking.

Organizational capabilities are built upon such resource factors as infrastructure, relevant systems, and human capital all of which determine the adoption of mobile banking (Zhu & Kraemer, 2005). Wu & Wang (2005) found ‘access to resources’ an important facilitating condition that significantly impacts people’s actual use of m-commerce applications. Human capital and IT literacy are critical in determining ICT adoption and use in any business. MSMEs are hindered from adopting ICTs by lack of adequate human capital, funds and other resources (Yap et al., 1992). MSME owners with high levels of IT literacy are more likely to adopt mobile banking technology. Despite the importance of a business firm’s physical assets and levels of technology awareness and readiness, complementary human capital is required if the firm is to take advantage of mobile banking (Zhu & Kraemer, 2005). Therefore it is feasible to conceptualize ‘organizational capabilities’ such as staffing structures as a factor that positively influences MSMEs’ behavioral intention to adopt and actually use mobile banking.

6.6.6 Emergent Consequences

In this study, emergent consequences are conceptualized as the unintended consequences of a social actor’s action (Giddens, 1984; Lyytinen & Ngwenyama, 1992). The theoretical model

presented in figure 6.2 shows that MSMEs' mobile banking usage decisions yield both designed and emergent consequences that feed back into the decision stream thereby shaping subsequent adoption and usage. When asked how they would react to an increase in fraud related to mobile banking transactions, 85% out the 89 MSME informants said they would stop using mobile banking in business transactions and only retain it for paying personal utility bills. One MSME operator responded thus,

“One supplier denied receipt of an advance mobile banking payment I had made the previous night and therefore failed to supply the stock I needed for the following day. From that moment I stopped paying all suppliers through mobile banking and reverted to traditional banker's cheque payments. It's a painful experience. I retain mobile banking service only for payment of electricity bills”.

Although 15% (13 MSMEs) said they would treat this as an isolated case among the suppliers, the above response seemed to dominate across the test sample. The same question was posed to MSMEs in relation to their decision to grant a customer's request to pay through mobile banking. 91.1% (81 MSMEs) said fraudulent encounters such as a customer claiming to have paid through mobile banking without having actually paid would not stop them from using mobile banking system but that they would modify the procedure such that no stock is delivered before payment is received and transferred to the MSME's bank account. Other empirical data in Table 5.9 expose the following emergent consequences,

- 1) **Crime mutation:** *Where an MSME dispatches goods on the strength of a mobile banking payment from a distant customer who quickly reverses it through the vendor's customer care center purporting to have sent the money to the wrong number and blocking the business owner from withdrawing the money.*
- 2) **Indirect depletion of capital:** *For instance MSMEs making frequent unnecessary withdrawals and depleting their business capital as a result of the easy access offered by mobile banking to finances.*
- 3) **Complex legal redress and reparation:** *For instance MSMEs spending more money trying to follow up a disputed mobile banking transaction since legal redress involves too many unrelated parties such as courts, security agencies, MNOs and banks. For example, mobile networks cannot print a statement without a court order which makes it too costly to follow up a small amount.*
- 4) **Business-unfriendly tariffs:** *For example transacting a large amount becomes very expensive since an MSME has to make multiple transactions at a maximum fee per*

transaction. The designed consequence of limiting the amount transferrable per transaction is enhanced 'security and safety' but it hurts MSMEs and may cause some operators to revert to alternative banking methods.

Empirical quote,

"Most of my customers are geographically dispersed and when I encounter a case of fraud I simply stops dealing with the bad customer but continue to use mobile banking more carefully and for lesser amounts".

The above empirical observations provide a basis of the following proposition,

P6: *Emergent consequences such as an increase in fraudulent encounters and crime will most likely feed back into the decision stream and modify the subsequent mobile banking adoption and usage decisions.*

Tenner (1997) contends that technology usage produces both good outcomes and 'revenge effects' or negative consequences that bite back. The concept of emergent consequences has been addressed in literature under the headings of 'unintended consequences' (Giddens, 1984; Lyytinen & Ngwenyama, 1992) and unexpected or unanticipated consequences (Allison & Merali, 2007). Identifying and understanding the types and causes of adverse consequences associated with information systems may enable developers to better manage development and maintenance of future systems (Ash, Berg & Coiera, 2004).

6.6.7 Designed Consequences

According to activity theory, developers embed specific functionality in IT artifacts during design (Kaptelinin & Nardi, 1997). The built-in functionality outlined in the product commissioning and marketing documentation shapes the target users' expectations. However that functionality is only subjected to real test during the actual usage. In Figure 5.6, 60 % and 28.89% of sampled MSMEs adopted mobile banking in order to save time for business and improve security and safety of business cash respectively. Other MSMEs adopted mobile banking after interacting with other satisfied technology users. 62% of MSME informants were however wary of network downtime. Empirical data in table 5.9 and figure 5.12 further indicate that many MSMEs adopted mobile banking because of it ubiquitous access [Table 5.9]. And as one MSME informant responded,

“It has freed my business transactions from dependence on time and location since I can deposit what I have earned during the day into the bank account from the comfort of my house including paying some suppliers” [Table 5.9]

Mobile banking usage may yield expected outcomes such as fast and secure transactions, ubiquitous access, and savings accumulation thereby boosting trust, confidence and credibility that will lead to continuous usage or positive descriptions that may trigger adoption by others. The foregoing empirical observations lead to the following proposition,

P7: Realization of designed consequences of mobile banking usage will most likely feed back into the decision stream and ensure continuous usage.

Usage of information systems have been found to yield both intended and unintended consequences (Lyytinen & Ngwenyama, 1992; Ng’ambi & Brown, 2009). Lyytinen & Ngwenyama (1992) concluded that the usage of computer supported cooperative work (CSCW) software yielded intended and emergent outcomes that were shaped by and in return shaped aspects of the organizational context.

6.7 Conclusion

This study’s theory as presented in figure 6.2 exposes a structurational relationship among decision criteria, antecedents of technology adoption, behavioural intention to adopt, and the designed and emergent consequences of actual usage. This theory provides a scholarly link between EDTM and structuration theory (Giddens, 1984; Gladwin, 1989). Lyytinen & Ngwenyama (1992) is a good exemplar that demonstrates the existence of a structurational relationship between organizational context and the consequences of the actual usage of information systems. Bailey & Ngwenyama’s (2013) investigation of telecenter usage demonstrates the feasibility of EDTM approach to extract decision criteria based on which determinants of an intended behaviour and propositions may be constructed. The derived theory introduces two constructs namely the ‘designed consequences’ and ‘emergent consequences’ that arguably feed back into the decision stream by generating new decision criteria with the potential to modify the behavioural intention to adopt and the subsequent actual usage [Figure 6.2].

Chapter 7: Conclusion**7.1 Introduction**

This study contributes to the IS body of knowledge in terms of theoretical conceptualizations, methodological evaluations and practice-orientation aspects of the mobile banking usage by MSMEs. The resulting theory reveals a structurational relationship between consequences of mobile banking usage and the adopters' decision-making criteria empirically obtained from the users. Gladwin et al. (2002, p. 523) argue that although ICT adoption has potential to accelerate the growth of developing economies, 'such development is only achievable when done by people themselves rather than by institutions for them'. The thesis reinforces the importance of a user-centered evaluation of ICT4D initiatives as opposed to a technocentric approach that is limited to the IT artifact itself (Gladwin, 1989a; Gladwin, 1989b; Gladwin et al., 2002).

The study presumably offers an improved understanding of how context-specific ICT4D usage consequences could help ICT4D researchers, practitioners, donors and governments to formulate better and more actionable ICT policies grounded in solid knowledge of the target users (Duncombe & Boateng, 2009). The study exposes security lapses and loopholes of mobile banking technology in a usage context which is vital to the enactment of legislation and designing of civic education programmes to train MSMEs on such pertinent issues as developing a savings culture. Development issues relating to financial transaction systems require highly effective control regimes that are grounded on sound research (Donner & Tellez, 2008). Therefore, telecommunications as well as banking and monetary regulators including central and or reserve banks will presumably find the findings of this research useful.

7.2 Revisiting Research Questions

According to sub-sections 1.4.1 and 1.4.2 this study set out to investigate the relationship between Kenyan MSMEs' mobile banking adoption decision criteria and the designed and

emergent consequences of the actual usage. This was achieved by analysing the decision criteria of the initial adoption decision and two other actual usage ‘cash-in’ and ‘cash-out’ decisions. EDTM, a cognitive approach provided a way of unearthing the consequences of mobile banking usage by MSMEs. The decision criteria underlying three MSMEs’ decisions namely: to enrol for mobile banking technology service; to pay a supplier through mobile banking; and to allow a customer to settle his or her bill through mobile banking technology, were also analysed. The study achieved its objective by first generating a set of descriptive statistics presented in section 5.2 to describe and explain the MSMEs’ perceptions of the mobile banking technology. The adoption and actual usage decisions analysis yielded the ethnographic decision models presented in sections 5.12, 5.14 and 5.15. The study further employed structuration theory to explain how mobile banking adoption and usage decision criteria were enabled and constrained by the social relations and social structures arising from the interaction between Kenyan MSMEs and other institutional actors such as banks, mobile-money transfer agents, and mobile network operators, as articulated in section 6.3. Section 6.4 outlines the unintended consequences of mobile banking usage and discusses the inferences derivable from the research findings. The findings offer vital information for the formulation of effective regulatory frameworks as well as guidelines for evaluating the impact of ICT4D initiatives after deployment in social-cultural contexts (Donner, 2007). The need to relate practice and research output is desirable and possible (Robey & Markus, 1998, p. 10). Williams, Booth & Colomb (1995) contend that, “mistaken ideas even dangerous ones flourish because too many people accept too many opinions on not very good evidence... and that those who act on unsound opinions can lead themselves and others to disaster” (p. 11). It is catastrophic to act on unsound policies founded on unsound knowledge and execute our intentional actions on unproven facts, both to shape our lives and those of others and to define our environment (Williams, Booth & Colomb, 1995).

7.3 Research Contributions

A summary of this study’s contributions to knowledge is set here below.

7.3.1 Theoretical Contributions

This study has formulated an explanatory-predictive theory in the form of a theoretical model from which seven propositions are derived and discussed in section 6.6. The derived theory extends known theoretical models of adoption such as TAM but exposing the structural relationship between decision criteria, determinants adoption and the consequences of actual usage of ICT (Lyytinen & Ngwenyama, 1992). The adoption determinants are mapped from the decision criteria underlying the adoption decisions represented by the three ethnographic decision models in figures 5.12, 5.14 and 5.15. The study argues that the consequences of using an ICT artifact may be inferred from the decisions made by its adopters hence the phrase '*consequence-decision theory*'. This thesis practically demonstrates how structuration theory may be used to make sense of an ICT4D research context. Clear examples have been provided of structuration concepts such as time-space distancing, signification, domination, legitimation, duality of social structure and agency among others. The study particularly addresses some of the theoretical limitations cited as hampering ICT4D evaluations (Gomez, 2008; Gomez & Pather, 2011). This thesis contributes to the social shaping of technology (SST) project by demonstrating that the usage of mobile banking technology shapes and is shaped by the contextual business relations among social and institutional actors (Williams & Edge, 1996). In particular, this discounts the perspective of technological determinism which postulates that the direction of change and usage outcomes of ICTs are determinate, preplanned and unproblematic (Williams & Edge, 1996). The study reinforces the argument of SST researchers that ICTs are socially shaped by and shape their usage contexts (Williams & Edge, 1996).

The derived theory incorporates and extends some of the existing adoption theories (Tornatzky & Klein, 1982; Davis, 1989; Rogers, 2003; Venkatesh et al., 2003; Oliveira & Martins, 2011). For instance, Fishbein & Ajzen's (1975) theory of reasoned action (TRA) explains how beliefs, subjective norms and attitude shape the behavioural intention to adopt a technology which in turn influence the actual usage behaviour. By using EDTM to explore the decision criteria this study's theoretical model extends TRA by shedding more light on what constitutes the normative beliefs and attitudes that determine the MSMEs' intention to adopt mobile banking. This study's theoretical model further sheds light on what constitutes

‘external variables’ that influence perceived usefulness and perceived ease of use in Davis’s (1989) technology acceptance model (TAM) derived from TRA, when applied to MSMEs’ mobile banking adoption behaviour. The theory also provides a cognitive approach for generating the variables that determine the behavioural intention to adopt mobile banking when using ‘unified theory of acceptance and use of technology’ (UTAUT) (Venkatesh et al., 2003).

While these models have made significant contributions to the understanding of the technology adoption phenomena, some gaps are still evident. First, the models do not use a cognitive approach to unearth the decision criteria underlying the adopter’s decision. Secondly, none of the models explicitly explains how individual decision models translate into a group behavioural decision model as does the ethnographic model. These gaps serve to demonstrate the theoretical contribution of this study. The theoretical model in figure 6.2 incorporates EDTM as an empirical means to examine how MSMEs operators make mobile banking technology adoption decisions and therefore yields findings that may inform the design of policy and other mechanisms to protect consumers.

7.3.2 Methodological Contributions

The results of this study demonstrate that EDTM is a feasible empirical research approach to contextually appraise, monitor and evaluate endogenous and exogenous decision criteria associated with the choice processes of ICT4D adopters. From the three models it can be inferred that EDTM an ethnographic approach to derive decision criteria ex-poste from the users themselves (Gladwin, 1979). The application of EDTM in this study expands the menu of ICT4D impact research methods by motivating the use of a cognitive research approach (Beck, 2005). The propositions generated in section 6.6 provides a scholarly basis that EDTM may be used to verify statistical findings of previous studies or generate independent variables to support future positivist research (Fitzgerald & Howcroft, 1998, Bailey & Ngwenyama, 2013). Focusing on the culture bearers’ views, the study further argues that EDTM is an effective empirical means for investigating intangible and non-quantifiable aspects of ICT4D projects (Gomez, 2008; Gomez & Pather, 2011).

In addition, it is hoped that the thesis itself will be a welcome contribution to the ongoing ontology-epistemology debate between structurationists and critical realists in their quest for a scientific philosophy with potential to mediate between the monistic-deductivist positivism and the monistic anthropocentric interpretivism research approaches (Sawyer, 1992). This thesis hopefully shows that the continued antagonism between the positivists' 'hard' camp and the interpretivists' 'soft' is unnecessary and as Fitzgerald & Howcroft (1998) put it, the metaphor of magnetic polarity might help IS researchers to recast the debate at a macro level that is more accommodative of different research approaches. After all, quality and quantity are neither antithetical nor antagonistic alternatives.

This study further contributes to the long scholarly debate on methodological pluralism (Creswell et al., 2008; Mingers, 2001). Presumably, the thesis illustrates the viability of a trans-paradigmatic approach to IS research (Mingers, 2001). The study shows that IS researchers may combine multi-paradigm research methods with complementary potentials, despite having a possible ontology-epistemology monism at the top (Weaver & Gioia, 1994; Morgan, 2007). The thesis reinforces Robey & Markus's (1998) claim that, while paradigmatic incommensurability may exist at the overarching ontological and epistemological level, a pluralist ecumenical accommodation remains possible at the lower methodological and axiological levels. By effectively weaving an ethnographic research component with an exploratory survey design, this study further reinforces the claim made by Firestone (1990) that, 'in the practice of research, the walls that divide paradigms just break down'.

EDTM combines a large qualitative ethnographic research phase with a quantitative hypothesis testing phase (Gladwin, 1989). EDTM's mixed-methods design and use of different samples minimises biases and increases acceptability of research findings. The sequential combination of qualitative and quantitative research approaches in a single EDTM research programme is not a sign of weakness as methodological isolationists would claim, but a pointer to its versatility and resourcefulness (Beck, 2005; Edmonds, 2010). To lend support to this argument, an analogy has also been advanced that compares the use of qualitative and quantitative approaches in one research programme, to the act of using

different lenses in photography in order to capture different views (Edmondson & McManus, 2007; Peacock, 2001). To raise the objectivity profile of EDTM, Jonsen & Jehn (2009, p. 136) argue that, unlike observational data which represent micro-analytical glimpses of short periods of activity, decision tree graphs provide a clearer picture of what is going on, seen from the decision makers' perspectives. The tree graph thus reduces the subjectiveness of the researcher which is inherently embedded in observation techniques and interpretation. A general consensus exists among researchers that all inquiry processes used to aggregate and interpret research data whether scientific or naturalistic, suffer a form of subjectivity (Greene & Caracelli, 2003; Greene & McClintock, 1985; McGrath, 1982). Ethnographically obtained local knowledge invaluablely sheds light on what informants do and why they do it (Bailey & Ngwenyama, 2013; Gladwin, 1989).

7.3.3 Practical Contributions

To champion a practice-oriented research it has been argued that theoretical considerations make little sense to IS practitioners and that the choice of a research approach should be contingent upon the envisaged practical applications rather than being merely rooted in theoretical conceptualizations (Ormerod, 1997, p. 421). Ormerod (1997) follows Keen (1991) and postulates that an approach that combines theoretical considerations with practitioner focus increases the relevance of its research outcomes by bringing on board both IS researchers and practitioners. Perhaps a question to grapple with is 'If the outcome of research does not inform practice, then what is it for?' And as (Ormerod, 1997) posits,

"The chosen research approach including methods and their theories must support a process of intervention (practice) in a particular context to achieve the desired outcome" (p. 421)

The emergent outcomes of mobile banking usage including mutation of crime, indirect depletion of capital, complex legal redress and reparation, and business-unfriendly tariffs discussed in section 6.6.6 could inform practice by acting as reference points to the process of designing mobile banking regulatory frameworks. Mobile banking application designers may also find the research findings useful to the decisions they make in relation to incremental

application design intended to enhance service security. This is a contribution to design science which is generally concerned with the methods that guide the practice of developing high quality and relevant IT artifacts. Notably, illegitimate use of mobile banking systems by money launderers and fraudsters have in the recent past brought together the stakeholders and regulators in the banking and telecommunication sectors, in a joint effort aimed at designing policies and frameworks to protect consumers and financial institutions. For instance, the Zanzibar Declaration during which the first African Mobile Financial Services Policy Initiative (AMPI)⁶ was launched is a good example of the on-going efforts that would benefit from the findings of this doctoral research.

The decision models in sections 5.12, 5.14 and 5.15 predict the decision criteria or preconditions underlying MSMEs' mobile banking adoption and usage decisions. It is informative for stakeholders to know what preconditions MSMEs evaluate when deciding to register or not to register for mobile banking service; the decision to pay suppliers, utilities and employees through mobile banking. IS designers may want to formulate technological interventions at meso level especially in the event of a perceived threat to mobile financial transactions and arguably speaking, the predictive decision models generated from MSMEs could guide this process. In addition, regulators may want to design a policy intervention based on emergent issues relating to monetary systems and or telecommunications infrastructure sharing. Again, this regulatory formulation may be premised on the ethnographic decision models built and validated with a larger sample of MSMEs. In conclusion, we could say then that there is considerable reason to base interventions on the ethnographic decision models.

7.4 Limitations and Further Research

EDTM, the methodology employed in this study, is arguably a resource-intensive approach. In particular, the researcher had to grapple with time constraints, given the need to spend prolonged periods in the research context while conducting participant observations ethnographic interviews with MSMEs across the two counties, revisiting some informants to

⁶ <http://www.afi-global.org/african-mobile-phone-financial-services-policy-initiative-ampi>

clarify certain decision criteria. To complete the study within the limited time allowed for a doctoral study, small sample sizes were used. The small sample sizes combined with the context-specific nature of the research means that the findings should not be blindly generalized and that the cultural factors of a new context should be factored in. The findings are based on MSMEs' within or close to urban centres and therefore it would be nice to conduct a similar study on rural-based MSMEs and compare the results.

Other challenges encountered included: cost constraints, difficulties in construction of study samples for the three decisions modeled given that some MSME operators were in their own account too busy to be available for the 90 minute ethnographic interview. Therefore the researcher spent a lot of time visiting many MSMEs that did not form part of the final study samples. Although mobile banking is arguably an effective financial deepening tool in developing economies, this thesis shows that culturally tuned legislative and ICT policy reforms and marketing may still need to be undertaken by stakeholders in order to promote the adoption of mobile banking services among MSMEs and low-income persons. To deepen theoretical contributions concerning MSME choice with regards to registering for a mobile banking service, further theoretical elaboration is needed based upon the concepts and the propositions derived from the decision tree models. In particular, a statistical test should be designed to test the significance of the theoretical model in figure 6.2. Further research is required to test the three decision tree models in other contexts.

7.5 Concluding Remarks

This study takes cognizance of the fact that making research conform to the academic norms of scientific rigor and scholarship is important but should not lose sight of the fact that the domain of our research lies in the realm of practice, which values knowledge that can be directly applied to professional and business practice (Ormerod, 1997). Governments in developing countries should exploit the potential of mobile banking technology and lower the cost of financial service delivery for the financially excluded people in order to accelerate the financial-deepening agenda aimed at reducing income inequality and poverty (Beck & Demirgüç-Kunt, 2008; Beck et al., 2008; Rousseau & Wachtel, 2011; Townsend & Ueda, 2006). Addressing these implications will presumably keep mobile banking stakeholders from

falling victims of Malinowski & Frazer's (1922) scholarly prophecy that "*If a man sets out on an expedition determined to prove certain hypotheses, if he is incapable of changing his views constantly and casting them off ungrudgingly under pressure of evidence, needless to say his work will be worthless*" (p. 8).

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APPENDICES

Appendix I: Research Timeline on a Gantt Chart

The Gantt chart depicts the research execution timeline for the entire study.

SNo	Research Execution Activities (serial & Parallel)	2011		2012				2013		2013/14	
		Feb to July	Oct to Dec	1 st Qtr Jan to mar	2 nd Qtr Apr to Jun	3 rd Qtr July to Aug	4 th Qtr Sept to Dec	1 st Qtr Jan to mar	2 nd Qtr Apr to Jun	07/13 to 08/13	09/13 to 06/14
1.	Develop and Defend Research Proposal										
2.	Conduct a Deeper Literature Scan										
3.	Preliminary Data Collection										
4.	Model-building (Cyclical-discovery phase) using ethnographic fieldwork techniques										
	(i) select decision(s) to investigate										
	(ii) formulate decision alternatives										
	(iii) Conduct ethnographic interviews (Spradley, 1976)										
	(iv) do participant observation, of SMEs' interactions with mobile banking										
	(v) sampling of decision makers										
	(vi) Select the actual decision criteria or constraints to use with the model										
	(vii) Construct a group decision model from the individual decision criteria										
5.	SUBMIT PROGRESS REPORT TO SUPERVISOR /conference										
6.	Model validation (hypothesis-testing phase) of EDTM										
	(i) Design a formal questionnaire to test the composite model										
	(ii) decide on a representative sample of decision makers with whom to validate the model										
	(iii) Elicit quantitative data about the decision outcome before participants are asked about the specific preconditions for their decision.										
	(iv) identify model test errors (Failure to predict choice)										
	(v) Calculate both the error and success rates										
	(vi) Modify group model if it predicts less than 85% of decisions in test sample										
	(vii) for low prediction revise and test newly devised alternative model with the test sample data										
7.	SUBMIT PROGRESS REPORT TO SUPERVISOR/conference										
8.	Data analysis and Interpretation of findings and applications										
9.	Submit Thesis Draft (1-3)										
10.	Make Corrections (if any)										
11.	Submit Final Research Thesis										
12.	Target Graduation Date (12/2013 or 06/2014)										

Appendix II: Data Instruments: Letter of Introduction, Consent Form, Interview Protocol and Participant Observation Checklist)



UNIVERSITY OF CAPE TOWN
FACULTY OF COMMERCE
Igniting Knowledge and Opportunity

Mwangi James Boniface

PhD Candidate, Department of Information Systems,
Faculty of Commerce, University of Cape Town
Private Bag, Rondebosch, 7701
Cape Town, South Africa

Date: 02 March 2012

TO OWNER/MANAGER OF TARGET SME

Dear Sir/Madam,

RE: INTRODUCTION LETTER TO COLLECT DATA FOR DOCTORAL RESEARCH

My name is Mr Mwangi James Boniface, a PhD student in the Department of Information Systems, University of Cape Town, South Africa. I am now at the data collection stage of my research and would like to interview you. The overall objective of this doctoral study is to investigate the designed and emergent consequences of mobile banking usage by small and micro enterprises (SMEs) in Kenya and to further determine their legal, economic, social-cultural and technological implications on vendors and regulators of the core sectors. It is my sincere hope that the outcomes of this in-depth qualitative research will go a long way to inform the process of designing an optimal regulatory regime sufficiently balanced to guarantee consumer protection without stifling innovation and development of new ICT services to benefit the poor. More specifically, the objectives of this study include: (i) To unearth the designed and emergent consequences of mobile banking usage by SMEs in Kenya, (ii) To test and demonstrate the suitability and feasibility of Ethnographic Decision Tree Modeling as a method for assessing the impact of ICT-4-Development initiatives, and (iii) to examine the implications of revealed consequences for the policy and regulatory interventions. In light of the forgoing, I am writing to request you to voluntarily provide research data through interviews and or survey questionnaire (attached herewith) to support this research endeavour. In case you are interested in receiving the results of this study, you are welcome to request a copy of the final report by supplying your name and email address. Any information you provide will be used for academic research purposes only and your responses will be held confidentially. Attached please find a Consent Form for a more elaborate summary of the study provided for maximum possible disclosure and to enhance your comprehension of the study and possibly secure your voluntary agreement to participate in the research. Kindly read and sign the Consent Form as evidence of your voluntary participation. Your co-operation is highly appreciated. Any queries regarding the questionnaire or the overall study can be directed to the undersigned.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Mwangi James Boniface'.

Mwangi, James Boniface

Doctoral Candidate, University of Cape Town (South Africa)
Mobile: +1 647-927-7934 Email: mwnkar002@myuct.ac.za

CONSENT FORM NO []

DATE ____/____/2012

YOUR CONSENT TO PARTICIPATE IN A DOCTORAL RESEARCH STUDY

Project Title: *An Analysis of the Designed and Emergent Consequences of Mobile Banking Usage by SMEs in Kenya Using Ethnographic Decision Tree Modeling*

Purpose of the Study: Why is this Research Being Done?

This is a doctoral research project being conducted by Mr. Mwangi, James Boniface, a PhD Candidate at the University of Cape Town, Department of Information Systems. The study is being conducted under the supervision of Professor Irwin Brown. You are being invited to volunteer and participate in this study because you are either the owner or senior manager of a small business operating within Nairobi and its environs that uses mobile banking systems and that you have sufficient authority to adequately represent the business. It is assumed that you use mobile payment systems such as M-PESA, Zap, YuCash, Orange Money, M-KESHO or other such solutions in business transactions. About 120-150 owners and managers of micro, small and medium enterprises (SMEs) will be interviewed.

The study will analyse the lived experiences of Kenyan SMEs when using mobile banking and further examine their legal, economic, social-cultural and technological implications on vendors and regulators of the core sectors. It is envisaged that the outcomes of this in-depth research will inform the design of optimal regulatory framework(s) sufficiently balanced to guarantee consumer protection without stifling innovation of new mobile-driven services to benefit the poor. Specifically, the study seeks: (i) To investigate the anticipated and unanticipated outcomes of mobile banking usage by SMEs in Kenya, (ii) To test and demonstrate the suitability and feasibility of Ethnographic Decision Tree Modeling as a method of evaluating the developmental impact of ICTs, and finally (ii) to examine the implications of revealed consequences for the policy and regulatory interventions.

Please read this form and ask any questions that you may have before agreeing to take part in the study.

Procedures

If you agree to be in this study, you will be asked to do the following:

- i) First and foremost, to ensure that this consent form is read and adequately explained to you.
- ii) To have any questions you may have answered to your satisfaction by either the principal investigator or his research assistant (s).
- iii) Once requirements (i)-(ii) have been fully met then you will be asked to sign this Consent Form as evidence that you are willing to participate in this research process.
- iv) The investigator will then ask you to specify the most convenient time and venue to interview you on behalf of your small business. If it is okay with you the interview may take place immediately in your business premises (NB: interviews and participant observations at the business venue may occur concurrently during model-building phase). The questions to be asked are contained in attached interview schedule.
- v) Depending on whether the study is in model-building or model-testing phase the researcher may skip step (iv) and request you to spare about 10-20 minutes and fill a short and simplified anonymised survey questionnaire – see the attached addendum. This will be explained to you. Care will be taken not to avoid rude interruptions of normal flow of business operations.

- vi) Where audio and voice recording is deemed necessary your permission will first be sought verbally. You have the option to agree or decline as shown here below under ‘*Waivers of elements of confidentiality*’
- vii) The researcher will then give you a chance to comment on your interview experience and then say closing remarks.

Length of Participation

Each participant will only be interviewed in a single session lasting about 45minutes to 1 hour. If an urgent call to attend to an emergency comes up, you will have the option to ask the interviewer to reschedule the interview. Kindly be advised that the interviewer may terminate the interview without your consent if the venue becomes risky or there is dangerous commotion in the vicinity.

Confidentiality

- i) In published reports, there will be no information included that will make it possible to identify you without your permission.
- ii) Carefully selected pseudonyms will be used to disguise and protect your personal and business identity in the monograph.
- iii) Data collected will be used only for academic research purpose and not for any other purpose.
- iv) Research findings will be published through a dissertation to be kept under the custody of the University of Cape Town library.
- v) While it is true that selected sections of the study results may be disseminated through supervisor-approved avenues, such as referred academic journals, conferences or doctoral consortia, care will be taken to ensure that the privacy rights and freedoms of all study informants and stakeholders are sufficiently protected.
- vi) Research subjects may or may not request the findings of the research.
- vii) Care will be taken to either use a lockable data storage room and or filing cabinet.
- viii) Apart from using only identification codes on data forms, the researcher will use computer files that are password-protected.
- ix) Where surveys are employed, such surveys will be completely anonymous and will not contain information that might personally identify you or your business.
- x) Finally only the researcher will have access to the identification key thus guaranteeing maximum confidentiality of the information you give.

If an academic paper or report is written about this research project, your identity will not be disclosed. In accordance with legal requirements and professional standards, disclosure will be made only to appropriate government agencies and regulatory authorities of any information either considered useful in public policy formulation or pointer to potential harm to mobile banking users.

Waivers of elements of confidentiality

Your name will not be linked with your responses unless you specifically agree to be identified.

I consent to being quoted directly. Yes () No ()

Risks

This being a purely academic study, no physical, psychological, social, emotional, legal or financial risks associated with participating in this doctoral research is envisaged.

Benefits of being in the study include

Although this research is not designed to benefit you personally, the findings may help the PhD candidate and his supervisor learn more about the developmental role and impact of mobile banking when used to bank the unbanked poor and people in the low income bracket. We hope that, in future, other people including micro, small and medium enterprises might benefit from the outcome of this study through improved understanding of mobile banking by Kenyan SMEs

Rights

Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. There are no penalties incurred for declining to participate or terminating your participation at any time.

Costs

You will not incur any costs for participating in this research as an information source.

Compensation

Although there are no reimbursements for your time and participation in this study, you have a right to request for a summary of the research findings.

Audio Recording of Study Activities

To assist with accurate recording of participant responses, interviews may be recorded on an audio recording device. You have the right to refuse to allow such recording. Please select one of the following options:

I consent to audio recording. Yes () No ()

Video Recording of Study Activities

To assist with accurate recording of participant responses, interviews may be recorded on a video recording device. You have the right to decline such recording. Please select one of the following options:

I consent to video recording. Yes () No ()

Photographing of Study Participants/Activities

In order to preserve an image related to the research, photographs may be taken of participants. You have the right to decline taking of photographs. Please tick one of the following options:

I consent to photographing. Yes () No ()

Summary of Findings and Contacts

If you wish to have a summary of the findings of this research when the study is complete, please contact the principal investigator. You may relay your questions to Mwangi, James Boniface (PhD Candidate) via Tel. +1 647 927 7934, mwnkar002@myuct.ac.za or to Prof. Irwin Brown (Thesis Supervisor, Academic Advisor and PhD IS Convener) via Irwin.brown@uct.ac.za.

Statement of Consent

I have read the above information. I have asked questions and have received satisfactory answers. I consent to participate in the study.

Signature _____

☐ MSME Owner / ☐ Manager

Date

Signature _____

☐ Principal Researcher/ ☐ Agent

Date

INTERVIEW PROTOCOL: EDTM's MODEL-BUILDING & TESTING PHASES

Interview Details:

SME Interview No.	
Interviewer Name	
Date of Interview	
Venue of the Interview	
Duration	
Interview Language	

Introduction:

This interview guide was formulated using concepts drawn from real-life choice and structuration theories, and ethnographic lens of cultural systems paradigm to aid data collection for the model building and validation phases of ethnographic decision tree modeling (EDTM).

Instructions:

Fill or tick as necessary. Short notes can as well be taken.

Section A: Demographic Information of the SME:

Gender:	Male [] Female []
Age (Years)	16-20 [] 21-25 [] 26-30 [] 31-35 [] 36-40 [] Above 40 []
Highest Education	KCPE [] KCSE [] Diploma [] Degree [] Masters [] Doctorate []
SME Position	Owner [] Manager [] Senior employee []
Business Location	Nairobi [], Area Environs [], Area.....
SME Classification	Micro [] Small [] Medium []
SME Communication (multiple responses)	Cell Phone []Fixed Line [] Email [] Website []
Business Details	Core Business Total No. of Employees.....

Section B:

1. Which **year** did you first learn about Mobile Money (Mobile Banking) systems? [.....]
2. From whom did you first learn about Mobile Money (Mobile Banking) systems?
At the Business [] Friends [] Relatives [] Media [] Others [] Specify
3. Are you now a registered Mobile Money (Mobile Banking) user?
Yes [] No []
4. If Yes in Q. 3 above, why did you register? (Go to Q. 6)
.....
.....
.....
5. If No in Q. 3 above, why did you NOT register?
.....
.....
.....
6. Which **year** did you register for a Mobile Money (Mobile Banking) system? [.....]
7. a) Has your business changed since you started using Mobile Money (Mobile Banking) system(s)?
Yes [] No [] (Skip to Q. 8)
- b) Describe briefly how your business changed since you started using Mobile Money (Mobile Banking) systems?
.....
.....
.....
8. Is Mobile Money (Mobile Banking) your **most preferred** mode of transacting money?
Yes [] No [] (Skip to Q. 10)
9. If Yes, in Q.8, give the reason(s) for it being your **most preferred** mode of transacting?
.....
.....
.....
10. If No, in Q.4, which then is your **most preferred** mode of transacting money?
Banking [] Others [] (Specify)..... None []
11. To what extent do you agree with the following statements:

‘The process of registration for Mobile Money (Mobile Banking) system is easier than the process of opening a bank account’

Strongly Disagree [] Disagree [] Not Sure [] Agree [] Strongly Agree []

‘Mobile Money (Mobile Banking) services are more accessible than formal banking services’

Strongly Disagree [] Disagree [] Not Sure [] Agree [] Strongly Agree []

‘Mobile Money (Mobile Banking) services have better customer service than formal banking services’

Strongly Disagree [] Disagree [] Not Sure [] Agree [] Strongly Agree []

‘Mobile Money (Mobile Banking) services help save more as compared to formal banking services’

Strongly Disagree [] Disagree [] Not Sure [] Agree [] Strongly Agree []

SECTION B:

12. Do you frequently transact with Mobile Money?

Yes []

No [] (Skip to Q. 14)

13. How frequent do you transact on a daily basis with Mobile Money (Mobile Banking) for your business?

Rarely [] Sometimes []

Frequent [] Very Frequent []

14. How would your business be affected if you had no access to Mobile Money (Mobile Banking) system?

Yes []

No [] (Skip to Q. 16)

15. Describe briefly how your business would get affected?

.....
.....
.....

16. Do you transact using the same mobile phone for both your business and personal transactions?

Yes []

No []

17. List the specific transactions you transact using Mobile Money (Mobile Banking) for:

Business transactions

.....
.....

Personal transactions

.....
.....

Are there any kinds of services for your business that you can get from Mobile Money (Mobile Banking) systems that you could not get from formal banking?

Yes []

No [] (Skip to Q.20)

18. If Yes, above, what kind of services do you get?

.....
.....
.....

19. To what extent are the services of Mobile Money (Mobile Banking) in your business available through other sources? (Testing awareness and attitude to alternative means of transacting)

Little extent [] Very little extent [] Not at all [] Big extent [] Very big extent []

20. What is the name or model of the phone that you use to transact on Mobile Money (Mobile Banking) systems?

21. In what category does your type of mobile banking/money phone fall?

Very simple [] Ordinary cell phone [] Smart phone []

22. Does the type of the cell phone you use matter (whether simple or sophisticated) when transacting with Mobile Money?

Yes [] No [] (Skip to Q.24)

23. If Yes, in Q. 23 above, explain the reason

.....
.....
.....

24. Do you leave the mobile phone used for Mobile Money (Mobile Banking) transactions in the business premises?

Yes [] (Skip to Q.26) No []

25. If No, above, explain the reason Why you don't leave it.

.....
.....
.....

26. Do you normally transact through the Same Agent of your Mobile Money (Mobile Banking) system?

Yes [] No []

27. Explain the reason for **either** of your answer in Q.26 above

.....
.....
.....

Section C:

28. What key challenge(s) have you encountered while using Mobile Money (Mobile Banking) systems?.....

.....
.....

29. Have you ever encountered a problem when using Mobile Money (Mobile Banking) systems?

Yes [] No [] (Skip to Q.33)

30. Briefly describe the problem(s) you encountered when using Mobile Money (Mobile Banking) systems?

.....
.....
.....

31. Who then solved the problem for you?
 Myself [] Mobile Money (Mobile Banking) Vendor [] Others [] (Specify.....)
32. Who frequently sorts out your Mobile Money (Mobile Banking) account problems?
 Myself [] Mobile Money (Mobile Banking) Vendor [] Others [] (Specify.....)

Section D:

33. Are you aware of any rules and regulations that govern the use of Mobile Money (Mobile Banking) systems?
 Yes [] No [] (Skip to Q.35)
34. If Yes, above, give examples of any of these rules and regulations?

35. Is there a mechanism available for giving feedback to the mobile banking vendor on issues of concern?
 Yes [] No []
36. What aspects of Mobile Money (Mobile Banking) systems would you say are enabling in your business operations? (cite the strengths from a business perspective)

37. What aspects of Mobile Money (Mobile Banking) systems would you say are restraining in your business operations? (cite the limitations from a business perspective)

38. Do you have any fears invoked in you when you are using Mobile Money (Mobile Banking) systems?
 Yes [] No []
39. If yes, above, what are these fears?

40. How does the maximum float set by the Mobile Money (Mobile Banking) system affect your business operations?

41. Suggest any improvements that you would like to be done in your Mobile Money (Mobile Banking) system?

42. Suggest any additions that you would like to be added to your Mobile Money (Mobile Banking) system?

.....
.....
.....

43. Kindly give us any other comments about Mobile Money (Mobile Money) systems that you would like us to know?

.....
.....
.....

44. Kindly give us comments or suggestions about this interview process

.....
.....
.....

Thank you for taking your time to respond to the questions.

SURVEY QUESTIONNAIRE: MODEL-VALIDATION PHASE

In line with Ethnographic Decision Tree Modeling (EDTM) requirements, this survey questionnaire has been constructed to test and or validate the composite decision model that was constructed using data collected from a set of 20-30 SMEs. Each decision criterion is represented as a question in the questionnaire. Kindly take note that this is an anonymous survey that does not link your responses to you personally. You are simply being asked to tick either YES or NO if that represents your personal response.

(A) FACTUAL QUESTIONS

- (1) Are you registered for any mobile banking/mobile payment service in Kenya?

yes_____no_____

(B) DECISION CRITERIA:

- (1) Are you used to sending or receiving money through cell phone? yes_____no_____

- (2) Do you want to have as much free time as possible? yes_____no_____

- (3) Is the mobile money solution cheaper than a formal banking account?

yes_____no_____

- (4) Do you withdraw money through cell phone because it's safer? yes_____no_____

- (5) Do you operate more than one small businesses and feel mobile banking comes in handy?

yes_____no_____

- (6) If you have a formal bank account do you find it difficult to access the funds in it for business purpose and feel like you are better off with mobile banking systems like M-PESA?

yes_____no_____

- (7) Have you been disappointed by the formalities of paying suppliers through conventional banking system especially small payments? yes_____no_____
- (8) Do you prefer being paid small amounts of debts through cell phones by your customer? yes_____no_____
- (9) Do you save money in your cell phone account especially the day's proceeds? yes_____no_____
- (10) Do you find bill payments such as electricity and water through mobile banking and do you feel it's faster compared with alternative methods such as cheque and cash that you apply for and then travel to deposit in service provider's account? yes_____no_____
- (11) Do you find mobile money solution providers more responsive in their customer support than formal banks? yes_____no_____
- (12) Do you feel more empowered by virtual of being registered for mobile money service? yes_____no_____
- (13) Is mobile money service your preferred mode of financially transacting
- (14) With suppliers, family members, customers, partners and utility firms yes_____no_____
- (15) Do you harbour any fears relating to your use of mobile money systems? yes_____no_____
- (16) Have you ever lost funds through mobile money transactions? yes_____no_____

Appendix III: PhD Research Authorization and Ethics Approval



UNIVERSITY OF CAPE TOWN :: FACULTY OF COMMERCE
INFORMATION SYSTEMS



TO'

Mwangi James Boniface, PhD Candidate,

And

Prof Irwin T.J. Brown, Research Supervisor

FROM'

Research Ethics Committee
University of Cape Town
South Africa

08 November 2011

Dear researchers,

RE: ETHICS APPROVAL – DEPARTMENTAL LEVEL

Your ethics application has been approved, so research may proceed.

Regards,

Dr Eric Cloete

Department of Information Systems
University of Cape Town

Research Associate of CITANDA
University of Cape Town

eric.cloete@uct.ac.za
(021) 650 2279



**Faculty of Commerce
Ethics in Research Committee**

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Post: University of Cape Town • Private Bag • Rondebosch 7701
Email: Irwin.brown@uct.ac.za
Telephone: +27 21 650-2311
Fax No.: +27 21 689-7570
8 March 2012

UCT/COM/016/2012

Kariuki Mwangi
Dept of Information Systems
University of Cape Town
Kariuki.mwangi@uct.ac.za

Dear Researcher

Project title: An analysis of the designed and emergent consequences of mobile banking usage by SMEs in Kenya using ethnographic decision tree modeling

This letter serves to confirm that the project entitled, "An analysis of the designed and emergent consequences of mobile banking usage by SMEs in Kenya using ethnographic decision tree modeling", as described in your final submitted protocol dated 1 March 2012, has been approved. You may proceed with the research.

Please note that if you make any substantial change in your research procedure that could affect the experiences of the participants, you must submit a revised protocol to the Committee for approval.

Best wishes for great success with your research.

Regards,

E CHAMISA

Dr Edward Chamisa
Commerce Faculty Ethics in Research Committee

"OUR MISSION is to be outstanding teaching and research university,
educating for life and addressing the challenges facing our society."



DOCTORAL DEGREES BOARD

UNIVERSITY OF CAPE TOWN

Masingene Building,

Private Bag X3, Rondebosch, 7701

Tel: +27 21 650 2202 Fax: +27 21 650 4913

Email: janine.isaac@uct.ac.za

18 November 2011

Mr Mwangi Kariuki JB (MWNKAR002)
P O Box 50552-00200 Nairobi
Thika Rd
Kahawa Sukari Ave

Dear Mr Kariuki

APPLICATION FOR REGISTRATION AS A PhD CANDIDATE

I am pleased to inform you that the Doctoral Degrees Board has approved your admission as a candidate for the PhD under the supervision of Professor I Brown.

The University requires that you are registered for a minimum period of two years, provided you maintain unbroken registration and comply with the rules for the degree. If you first register for the degree after 1 May, you may not count the remainder of the year as part of the minimum prescribed period of study for the programme. Provided you have met with these requirements, the earliest date on which you will be able to graduate is therefore two years after your first registration. I would like to remind you that you must renew your registration every year, not later than the last day of February.

Senate has adopted a set of guidelines for supervision for the information and use of candidates and supervisors. A copy of this is attached and we hope it will be useful.

The rules for the PhD (copy enclosed) give the dates by which you must notify this office of your intention to submit a thesis for examination. Early notification alerts the DDB to prepare for the examination process by getting examiners nominated, approaching them and obtaining their agreement before your thesis arrives. When advising of intention to submit, include the following information - student number, full names, postal address, thesis title, department and name of supervisor/s where any supervisor is not in the same department or at another university please indicate this.

Please note that there is an upper limit of 80 000 words on the main text of your thesis. Any request to exceed this limit must be discussed with the supervisor and final approval must be obtained from the Dean.

We wish you well with your research.

Yours sincerely

Janine Isaacs (Mrs)
DOCTORAL DEGREES BOARD

cc: Professor I Brown, Information Systems
Faculty Office, FACULTY OF COMMERCE
Ref: CC032011

Attachments